

Influences on preschoolers' altruism

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Abstract

There has been a resurgence of interest in prosocial behaviour in recent years, but many authors avoid the topic of altruism due to the difficulty of discerning the motives behind the behaviour. The present thesis takes a behavioural definition of altruism (i.e. that the point of interest is the altruistic action rather than the underlying motives) and employs a paradigm from experimental economics that minimises the impact of motivating factors aside from altruism: the dictator game. Preschool children's emerging altruistic behaviour is assessed and the norms governing this behaviour are hypothesised. Chapter 1 gives an introduction to prosocial behaviour in general, before focussing on altruism and the dictator game. It demonstrates that while behaviour in older children and adults is influenced by numerous intrinsic and extrinsic factors, little is known about influences on the altruistic and dictator game behaviour of preschool children. Chapter 2 conducts a standard DG with 4-5 year-old children with particular focus on the influence of siblings. It also examines the impact of endowment size, providing a reduced endowment in order to ascertain whether children's understanding of the numerosities involved influences dictator game behaviour. There was no effect of endowment size upon DG behaviour, but sibling status was found to influence donations, with children with older siblings being more likely to donate than those without older siblings. These results are discussed in terms of models of sibling influence. Chapter 3 extends these findings by examining whether adults behave similarly to children and whether the influence of older siblings remains in adulthood. A shift in the influence of siblings was observed, with adults with siblings being more generous than those without siblings, rather than older siblings in particular being beneficial. How these findings further inform models of sibling influence is discussed. Chapter 4 examines how the source of the endowment influences preschoolers' altruistic behaviour in the dictator game by asking children to earn their endowments rather than provide them as a windfall. While previous work has shown that adults are less generous

when they have earned their endowment than when it is a windfall, children showed little difference in behaviour according to the source of their endowment, although there is evidence to suggest that children with older siblings are beginning to internalise the relevant norms (otherwise there was no effect of sibling status). Chapter 5 examines the effect of framing upon children's altruistic behaviour by providing different information about the recipient (rather than no information as is standard in the DG). Children gave more to a recipient with positive characteristics than one with negative characteristics and were also influenced by the mere possession of information. Chapter 6 sums up by demonstrating how these findings interact to inform our understanding of preschoolers' altruistic behaviour and outlines areas for future research. Altogether, this thesis demonstrates that there are numerous influences on preschoolers' altruistic behaviour but children are nonetheless similarly altruistic to adults rather than more selfish, as is often assumed.

Conference presentations

Work from this thesis was presented at the following conferences:

Social Cognition Workshop, University of Nottingham (November 2009) – *The development of altruism: the endowment effect*

BPS Developmental Psychology Section Conference, Nottingham Trent University (September 2009) – *The impact of siblings upon the development of altruism*

Social Cognition Workshop, University of Birmingham (June, 2009) – *The development of altruism*

Society for Research in Child Development Biennial Meeting, Denver CO (April 2009) – *The development of altruism*

Theory of Mind Workshop, University of Birmingham (June 2008) – *Theory of mind and the development of altruism*

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Chapter 1: General introduction

Anyone who pays attention to the news would find it easy to believe that humans have a huge capacity for antisocial behaviour but are much less inclined towards prosocial behaviour. This imbalance in reporting is also found in the psychology literature, with much greater emphasis being placed on antisocial than prosocial behaviours. Indeed, a recent search of Web of Knowledge for papers produced in the last ten years including the term 'prosocial' returned 2558 results; the same search including the term 'antisocial' returned 9116 articles, more than three times as many ("Web of Knowledge," 2010). Nonetheless, prosocial acts occur with a potentially surprising frequency – in any one day the majority of those of us lucky enough to live in a peaceful country will experience much more in the way of prosocial behaviours than in the way of antisocial acts. This thesis aims to explore the prosocial behaviour of altruism in a group that is often assumed to behave selfishly: preschool children.

This chapter is divided into four sections. Section 1.1 will begin by describing prosocial behaviour and its development, before outlining some of the influences on prosocial behaviour. Section 1.2 will focus on one form of prosocial behaviour: altruism. Definitions and theories of altruism will be considered and methodologies employed to examine altruistic behaviour will be discussed. Section 1.3 will explore one paradigm in particular in detail, the dictator game, which is the experimental measure that will be used throughout the thesis. Influences on dictator game behaviour will be outlined, criticisms of the dictator game will be considered, and explanations for dictator game behaviour will be explored. Finally, section 1.4 will round up by outlining some of the outstanding questions that this thesis aims to address with use of the dictator game.

1.1 Prosocial behaviour

The term 'prosocial' was introduced as an antonym of 'antisocial' (Wispé, 1972) and can be defined as a behaviour voluntarily undertaken in order to benefit another (Eisenberg et al., 1999). There are a number of behaviours that fall under the umbrella term of prosociality, including altruism, helping, sharing and cooperation (Eisenberg & Mussen, 1989), although there are doubtless numerous additional behaviours that fall into each of these categories (e.g. comforting, volunteering, etc.). Prosocial actions involve an individual providing a resource to benefit another individual or group. The resource in question is not necessarily a concrete item such as sharing food or donating money: it could be provision of support or volunteering time, to name just two examples. Cooperation differs slightly from other prosocial behaviours in that it is not unidirectional and thus involves less asymmetry, entailing two or more people working together to achieve a mutually beneficial goal (Penner, Dovidio, Piliavin, & Schroeder, 2005). Altruism, on the other hand, can be viewed as prosocial behaviour in its strictest sense, given that it is often argued that altruistic behaviour benefits another in the absence of benefit to the self; this is discussed in greater detail in section 1.2.

1.1.1 Prosocial development

A great number of studies in the developmental psychology literature over the last 50 years have found that prosocial behaviour increases linearly with age, with children gradually learning the social norms and personal benefits of acting in the interests of another (see Eisenberg, Fabes & Spinrad, 2006 for a comprehensive review). Hoffman (2000) has advanced a theory of prosocial development that is closely coupled with empathic development. In this theory, prosociality has its roots in emotional contagion and overt prosociality emerges as a child begins to distinguish between the self and other in the second year of life. Pure prosocial motives increase throughout childhood as role-taking

ability develops and the child begins to feel sympathetic distress for the plight of another, seeking to help because they feel sorry for the victim rather than in an effort to alleviate their own distress (as would a younger child). As empathic ability matures, the child can empathise beyond the immediate situation (the highest level of empathic ability), leading to an understanding of the victim's long-term plight. Presumably this ultimately leads to prosocial behaviours such as charitable donations and volunteering, where the recipient is not necessarily present.

Hay (1994) suggests that, rather than a linear increase in prosociality, there is a U-shaped function in prosocial behaviour with age. In the first two years of life the child is indiscriminantly prosocial, performing actions such as sharing with any recipient. Indeed, children as young as 18 months will cooperate with a stranger to achieve a shared goal or help a stranger retrieve an out-of-reach object (Warneken & Tomasello, 2007). After 2 years of age, Hay found that prosocial behaviour declines as the child learns the instances in which it is not only acceptable but beneficial to behave self-interestedly. Prosociality subsequently slowly increases as prosocial norms are learned and applied, becoming more stable after toddlerhood (Hay, 1994; Hay, Castle, Davies, Demetriou & Stimson, 1999).

Hay's (1994) view of prosocial development involves acquisition of social norms, which is dependent upon social interaction, while Hoffman (2000) takes a more maturational approach. While these two theories predict slightly different functions of prosocial development, they are not mutually exclusive. While, as stated above, many empirical studies find a linear increase in prosociality (Eisenberg, Fabes & Spinrad, 2006) and this appears incompatible with Hay's (1994) findings, it is possible that the developmental function is dependent upon the behaviour in question. Hay's U-shaped function may therefore be related to her focus on sharing behaviours; other behaviours that do not

appear to show such a function, such as helping and cooperating, may have a different developmental trajectory as they are less costly to the child (Eisenberg & Fabes, 1998). As such, it is possible that both empathic development and social interaction are important for successful prosocial development.

Cialdini, Baumann and Kenrick (1981) focussed more specifically on altruism, proposing a three-step model of its development. They argue that while altruism is not rewarding to begin with, children learn its rewarding properties through socialisation. This occurs in two ways: through positive reinforcement from adults and through experiencing a reduction in empathic distress when acting to help another individual. Furthermore, they propose that girls should internalise the rewarding nature of altruism earlier than boys as they are more likely to be socialised to be altruistic. In the first step of internalisation, the 'presocialisation' stage, altruistic behaviour is sporadic and slightly aversive as it involves loss of resources for the child. In the 'awareness of norms' step children are aware that altruism is valued but have not yet internalised the reward value of altruism, and so behave altruistically only when observed (Froming, Allen & Jensen, 1985 find that this occurs at about 7 years of age). The 'internalisation' step occurs by young adulthood, by which time children find altruism internally rewarding and so there is no longer any need for external observation or reinforcement. From this viewpoint, therefore, young children are capable of little altruistic behaviour; by middle childhood children will enact altruistic behaviours only to gain approval from others, while true altruism does not emerge until the teenage years.

Empirical observation supports the notion that prosocial behaviours increase through ontogeny. Explicit prosocial behaviours have been demonstrated in infants as young as 12 months old, who will attempt to comfort another individual in distress (Eisenberg &

Mussen, 1989; Hoffman, 2000). By 14 months, toddlers will sometimes attempt to help an adult in difficulty (e.g. by retrieving dropped items) and cooperate to achieve a shared goal (Warneken & Tomasello, 2007). These behaviours are more stable and frequently-occurring once the child reaches 18 months, and the child often undertakes them spontaneously (Warneken & Tomasello, 2006, 2007). Warneken and Tomasello (2009) argue that this early prosociality demonstrates innate altruism, especially since this prosociality seems to be intrinsically motivated given that when rewards are provided, rather than encouraging prosocial behaviour, it is decreased (Warneken & Tomasello, 2008).

Knafo, Zahn-Waxler, Van Hulle, Robinson and Rhee (2008) found that both empathy and prosocial behaviour increased between 14 and 36 months of age. Empathy was related to prosocial behaviour, although this relationship was stronger with prosocial behaviours directed towards the mother than towards a stranger. In their meta-analysis of 155 studies of prosocial behaviour, Eisenberg and Fabes (1998) confirmed that prosocial behaviour does indeed increase with age. It appears that this is dependent upon the type of prosocial behaviour measured, with sharing and donating but not instrumental helping or comforting showing an increase. Nonetheless, the influence of age remains even when the influence of behaviour type is controlled, suggesting a general age-related increase in prosocial behaviour. Conversely, Eisenberg et al. (1999) explored the consistency of prosocial dispositions through longitudinal comparison of prosocial behaviour at 4-5 years and in early adulthood. They found that children who showed early prosociality were likely to be prosocial adults, with early spontaneous sharing predicting later empathy and prosocial behaviour.

Changes in prosociality in adulthood are less well examined but the available evidence suggests that prosociality continues to increase throughout the life span. In a

representative Dutch sample spanning 15-89 year olds, the proportion of prosocially-oriented people increased with age (Van Lange, Otten, De Bruin, & Joireman, 1997). Furthermore, in a representative American sample with a mean age of 50 years charitable donations were found to increase with age (Carpenter, Connolly, & Myers, 2008), although this may reflect an increase in personal resources with age, which in turn can lead to greater freedom to donate to charity. While prosocial behaviour is initially egoistically motivated, as empathic ability develops the other's perspective is increasingly considered; however, rather than simply emerging over the childhood years, prosocial behaviour appears to continue to increase throughout a person's lifetime.

1.1.2 Influences on prosocial behaviour

Given the changes observed in prosocial behaviour through development, it is perhaps not surprising that numerous other factors also influence prosociality. These can broadly be divided into intrinsic factors and extrinsic factors: intrinsic factors such as personality, genes or emotions are internal to the individual, while extrinsic factors exert their influence through the wider environment, such as the culture the individual was brought up in or their family situation.

1.1.2.1 Intrinsic influences on prosocial behaviour

A fundamental component of prosocial behaviour is affect: people's emotions are aroused by others' situations, which can drive people to prosocial action (Penner et al., 2005). Prosocial emotions include guilt and empathy (Gintis, 2003a) and can lead to both egoistically and altruistically motivated prosociality. For instance, guilt arises when an individual has transgressed a social or moral norm and thus feels responsible for the suffering of another. This can induce the transgressor to seek to alleviate their own negative emotional state by behaving prosocially towards the victim (Batson et al., 1991;

Cialdini, Brown, Lewis, Luce & Neuberg, 1997); however, this 'reparation' is likely to arise at the expense of others around rather than the transgressor himself (de Hooze, Nelissen, Breugelmans, & Zeelenberg, 2011). While egoistically motivated prosociality is the result of experiencing personal distress, Batson et al. (1991) argue that empathic concern, in which the individual experiences other-oriented concern, produces altruistically-motivated prosociality with the aim only of benefitting the other person (see section 1.2.2). Altruism, therefore, is driven only by other-oriented motives, while other prosocial behaviours (such as helping, cooperating, comforting, sharing, etc.) may be driven by altruistic *or* egoistic considerations, or a combination of the two.

An individual's personality also influences their prosociality: people who are more Agreeable and Extraverted are more likely to indulge in prosocial behaviours (Caprara, Alessandri, Di Giunta, Panerai, & Eisenberg, 2010; Carlo, Okun, Knight, & de Guzman, 2005), a relationship that is mediated by possession of a prosocial social value orientation (SVO; Carlo et al., 2005). SVO refers to individuals' preferences for a balance in outcome between themselves and others (Van Lange et al., 1997) and some people are predisposed to seek prosocial outcomes. People can fall into one of three categories: *prosocial*, where they seek the best outcome for all involved, *individualist*, where they seek the best outcome for themselves regardless of others' outcomes, and *competitor*, where they seek an outcome that is better in comparison to that of others. Having a prosocial SVO predicts prosocial behaviours such as donations to noble causes (Van Lange, Bekkers, Schuyt, & Van Vugt, 2007) and volunteerism (Carlo et al., 2005), with people with a prosocial SVO being more likely to engage in prosocial behaviours than individualists or competitors.

In order to identify that someone has a problem and determine the course of action to take in order to help them with that problem, one needs to be able to take another person's

perspective (Warneken & Tomasello, 2006). Affective perspective taking (APT), the ability to identify and understand others' emotions, is known to be associated with prosocial behaviour (Knafo, Steinberg, & Goldner, 2011). However, there is a distinction between compliant prosocial behaviour, in which a person is responding to a request from another person, and self-initiated prosocial behaviour, where a person acts prosocially of their own volition (Eisenberg & Mussen, 1989). Knafo et al. (2011) demonstrated that while APT did not influence 3-6 year-olds' compliant prosocial behaviour (such as helping, comforting and sharing), children with low APT were less likely to spontaneously respond prosocially than those with high APT. APT therefore appears to enable children to infer the need for a prosocial response when a request is not directly made. Furthermore, perspective-taking appears to continue to influence prosocial behaviour as children get older. Sally and Hill (2005) examined the behaviour of typically-developing 6-10 year-olds and high-functioning children with autism spectrum disorder (ASD) in economic games designed to elicit prosocial behaviours such as cooperation and fairness. They found that possession of first order false belief ability (i.e. an understanding of others' mental states) was related to a decrease in cooperation in children with ASD (all typically-developing children passed the false belief task), implying that understanding first-order false beliefs is necessary for strategic responding. Second-order false belief ability (i.e. an understanding of others' embedded mental states, that is a person's understanding of another person's beliefs about a third person's mental state), on the other hand, was associated with increased cooperation and fairness regardless of whether the child was typically-developing or on the autistic spectrum. The authors suggest that early in development, theory of mind skills enable the child to recognise and conform to social norms, while as theory of mind ability develops it allows them to adapt these norms to suit their own needs (Sally & Hill, 2005).

Gender differences are often found in prosocial behaviour. While a gender effect is not always observed, when a difference is found females tend to behave more prosocially than males, a finding that Eisenberg and Fabes (1998) confirmed in their large meta-analysis of studies of prosocial behaviour. This gender difference is often attributed to girls being socialised to be more prosocial than boys, (Cialdini et al., 1981; Croson & Gneezy, 2009; Maccoby, 1988); however, more recently anatomical differences have been found that may contribute to gender effects on prosocial behaviour. Yamasue et al. (2008) conducted structural MRI scans on adult participants who had completed the Cooperativeness subscale of the Temperament and Character Inventory (Cloninger, 1987). They found evidence of anatomical sexual dimorphism in the form of females showing greater grey matter volume in areas associated with social cognition (including posterior inferior frontal gyrus and anterior medial prefrontal cortex). Moreover, they uncovered a significant positive correlation between overall grey matter volume and Cooperativeness scores in females but not males, independently of brain volume. This provides evidence that gender differences in prosocial behaviour may have a biological basis, although there is of course no evidence as to causality, i.e. whether females are more prosocial because they have greater grey matter volume or vice versa.

While it is not clear whether gender differences in prosocial behaviour are biological in nature, prosocial behaviour does appear to have a genetic component. Numerous studies have found that prosociality is heritable to some degree, although estimates vary (see Eisenberg et al., 2006 for an in-depth review). Longitudinal twin studies from Ariel Knafo's research group has recently revealed that the reason for these differences in estimates of heritability may in part be due to the fact that the influence of genetics upon prosocial behaviour changes with age. Knafo and Plomin (2006b) found that between 2 and 7 years, the influence of heritability upon parent and teacher report of prosociality increases, as

does the impact of nonshared environment, while the impact of shared environment drops over this period. By 3 years as much as 24% of the variance in prosocial behaviour (as measured by responses to simulated pain by mothers and examiners) was due to heritability, with 9% due to shared environment and the remaining 66% due to nonshared environment and error (Knafo, Zahn-Waxler et al., 2008). Interestingly, in a twin study examining the impact of genetics on adults' volunteerism, Son and Wilson (2010) found gender differences in the heritability of prosocial behaviour (as measured by hours volunteered per month): while women's volunteerism was heritable (although this influence was not as strong as the effect of nonshared environment), men's was not. Men's volunteerism was instead due to unique environmental effects. This finding is consistent both with Knafo's findings that nonshared environment became increasingly important to prosocial behaviour over the toddler years and Yamasue et al.'s (2008) finding that women's but not men's cooperativeness was positively associated with their grey matter volume. It appears that gender differences in prosocial behaviour may have a biological as well as social component.

1.1.2.2 Extrinsic influences on prosocial behaviour

While the evidence above has demonstrated that there are a number of factors internal to the individual that contribute to prosociality, the work of Knafo and colleagues has demonstrated that environment also plays an increasingly important role in prosocial behaviour (Ebstein, Israel, Chew, Zhong, & Knafo, 2010). Parenting is important, with a more authoritative parenting style being associated with greater prosocial behaviour (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000). The parenting style of mothers appears to be more influential than that of fathers, with mothers' authoritative style predicting teacher report and observed prosocial behaviour of their preschool children towards peers six months later. Fathers' parenting style showed a similar but weaker effect,

which the authors attributed to fathers being likely to spend less time with their children than mothers (Hastings, McShane, Parker, & Ladha, 2007). Knafo and Plomin (2006a) conducted a twin study examining the influence of parental positivity and negativity upon children's prosocial behaviour as assessed by parental report at 3, 4 and 7 years and teacher report at 7 years. They found that parental positivity (e.g. disciplinary practices that involve reasoning and explaining consequences) is associated with increased prosociality. Parental negativity, on the other hand (e.g. punitive or power-assertive discipline) is associated with decreased prosociality, possibly due to an emphasis on rule adherence rather than moral internalisation. Parenting also predicted prosocial behaviour longitudinally, even when controlling for previous prosocial behaviour.

While parents make an important contribution to their child's development, in the preschool years a child is likely to spend far more time with their siblings than their parents (Abramovitch, Corter, & Lando, 1979; Bank & Kahn, 1975). Opinion as to the degree of influence a sibling has on their co-sibling's development is divided, with some arguing that siblings have an enormous lifelong influence (e.g. Sulloway, 1996, 2001, 2007) and others arguing that siblings are only influential in the family situation (e.g. Harris, 2000). However, the presence or absence of siblings and a child's position within the sibling constellation has been little-investigated in the prosocial literature. Possessing siblings appears to benefit adults' social value orientation (SVO), that is a person's preferences for a balance in outcome between themselves and others (Van Lange et al., 1997). People fall into one of three SVO categories: prosocial, individualistic or competitive (see section 2.1.1 for a more detailed description of SVO). Van Lange et al. (1997) found prosocials to have significantly more siblings in general and also more older siblings than both competitors and individualists, leading them to suggest that possessing more siblings leads to a greater chance of experiencing conflicts of interest and the necessity to share resources. This

causes children to learn the benefits of cooperation and develop a prosocial SVO. Courtiol, Raymond and Faurie (2009), on the other hand, found firstborns to be less cooperative, being less trustful and reciprocating less in an economic game than middleborns, lastborns and singletons.

Laterborns have been shown to score higher than firstborns on Agreeableness (Michalski & Shackelford, 2002; Sulloway, 1996), a personality dimension that has been shown to be related to college students' volunteerism (Carlo et al., 2005). Indeed, when examining the altruism facet of Agreeableness, laterborns have been found to score significantly higher than firstborns (Jefferson, Herbst, & McCrae, 1998) and lastborns have been found to score significantly higher on the altruism facet than both middleborns and firstborns (Saroglou & Fiasse, 2003). However, in the only study to date to examine the impact of siblings upon a behavioural measure of altruism in children, the opposite effect was found. In their sharing game, in which a child must decide whether to choose one sweet for themselves and one for another individual, or to keep both sweets for themselves (i.e. sharing is costly to the child) Fehr, Bernhard and Rockenbach (2008) found that 3-8 year-olds children without siblings were more likely to share than children with siblings, while lastborns were less willing to share than children with younger siblings. The authors suggest that children with siblings experience more competition for resources, making them less willing to share, while singletons, who do not experience these conflicts, are the most generous. This opposite pattern is attributed to the use of a behavioural rather than a questionnaire measure (see section 2.1.1 for a more detailed discussion of this study). Given this mixed evidence in terms of both prosociality in general and altruism in particular, the influence of siblings upon prosocial behaviour remains unclear.

Given the frequent encouragement of prosocial behaviours in religious doctrine, religious people are widely regarded to be more prosocially-oriented than people who are not members of a religion. Indeed, it has been suggested that religious beliefs facilitated the evolution of cooperation through fear of supernatural punishment (Johnson & Bering, 2006). In their review of religious prosociality, Norenzayan and Shariff (2008) note that religious people report greater volunteerism and charitable behaviour than non-religious people. However, religiosity is also related to social desirability and behavioural studies suggest that where religiosity is associated with greater prosocial behaviour, it is the desire to maintain a positive reputation that is responsible for this association. This is clearly effective, as people perceived to be religious are also perceived as more trustworthy. The authors conclude that religious prosociality is a bounded phenomenon, being driven by the desire to maintain a positive reputation within the ingroup (i.e. other members of the religion) and that secular organisations are equally likely to produce charitable behaviour. This idea is consistent with findings showing that people are more prosocial towards members of their ingroup than outgroup members (see Penner et al., 2005). Grossman and Parrett (2011) suggest that a lack of context may have contributed to the heterogeneity in experimental results with respect to religion and prosocial behaviour. They surveyed the tipping behaviour and religiosity of patrons leaving restaurants (tipping can be considered prosocial as it is to the benefit of the server and is not mandatory) and found no evidence of religious prosociality. Consistent with Norenzayan and Shariff's (2008) conclusion that religious prosociality is a bounded phenomenon, religious people did not tip any more than non-religious people.

Prosociality varies from culture to culture, with individualist cultures often producing lower levels of prosociality than collectivist cultures (Eisenberg et al., 2006; Eisenberg & Mussen, 1989). Cultural differences in prosociality can be attributed to differences in the norms that

are applicable in different societies (Gintis, 2003a). Norms are rules of behaviour that are transmitted through imitation or teaching and enforced through the threat of sanctions for violation (Allison, 1992). As such, an individual will punish a norm violator even if the individual was not influenced directly by the transgression, leading to consistency in behaviour within groups but heterogeneity between groups (Bernhard, Fehr, & Fischbacher, 2006; Fehr & Fischbacher, 2004). Conforming to norms is so important to group interaction that individuals will internalise a norm, conforming to it even when not externally observed. Violation of this personal norm leads to internal sanctions such as guilt and shame (Gintis, 2003a; Perugini, Gallucci, Presaghi, & Ercolani, 2003; Schwartz & Howard, 1980) as a personal norm is sustained by self-evaluation and self-sanctioning rather than the threat of external sanctions in social norms.

Prosocial behaviour is an umbrella term that encompasses a variety of behaviours. This section has described the development of prosocial behaviour and has demonstrated how prosociality is influenced by numerous factors, both intrinsic and extrinsic. The next section will focus on one subset of prosocial behaviour, altruism.

1.2 Altruism

Altruism can be viewed as the apogee of prosocial behaviour, in that the benefit to the recipient comes at a cost to the actor (although a definition of altruism is remarkably difficult to agree upon, see section 1.2.1). Numerous self-interested motives have been suggested to account for apparently altruistic behaviour, and given the difficulty involved in distinguishing between these, many studies have avoided the issue entirely by instead focussing on more general prosocial behaviour. Nonetheless, there are several means of studying altruistic behaviour and recently an economic game, the dictator game, has made a great contribution to our understanding of altruism.

1.2.1 Defining altruism

Before embarking upon a discussion of altruism, it is necessary to provide a definition in order to create a framework within which the discussion will take place. However, definitions of altruism vary depending upon the discipline within which the definition is framed, with little consensus, even within disciplines, of what altruism means (West, Griffin, & Gardner, 2007). Indeed, Clavien and Klein (2010) note that it is not uncommon for authors to be inconsistent in their use of the term within a single paper. Within biology, for instance, altruism is framed in Darwinian terms as a behaviour that increases the reproductive fitness of the recipient at a cost to the reproductive fitness of the actor. The intentions behind the act are not considered, merely the outcome, and so an apparently altruistic act may have a selfish basis (de Waal, 2008; Sigmund & Hauert, 2002). Within economics, altruism is considered an 'other-regarding behaviour', in which economic benefits are conferred to a recipient at a cost to the actor (Clavien & Klein, 2010; Fehr & Fischbacher, 2003); once again outcomes rather than intentions are considered. In psychology, on the other hand, the motivation behind the behaviour is important. Altruism is an internally-motivated behaviour through which an individual seeks to benefit the recipient in the absence of external reward. Thus, altruism is motivated by factors within the individual rather than by the expectation of reward or sanctions (de Quervain et al., 2004; Eisenberg & Fabes, 1998; Penner et al., 2005).

The variety of disciplines that study altruism agree on one main point – that an altruistic behaviour must be beneficial to the recipient and have some sort of cost to the actor. Whether this cost is in fact outweighed by the positive consequences of engaging in such a behaviour (e.g. positive reputation, future reciprocation, avoidance of guilt, etc.; see section 1.2.2) is in many ways irrelevant as the outcome remains the same regardless of the motivation behind it. Indeed, attempting to find a selfish explanation for altruistic acts

devalues altruism, overlooking that an altruistic act has taken place regardless of whether the objective was 'truly' altruistic. As such, for the present purposes the term 'altruism' is used in a behavioural sense. This approach sidesteps the issue of motives, but this essentially comes down to a philosophical debate about the existence of altruism, one which it is not possible to resolve here. As such, the present thesis is concerned with the enactment of altruistic behaviours regardless of the intentions and motives behind them and will work from the following definition: altruism is *the enactment of a behaviour that is beneficial to the recipient but costly to the actor*.

1.2.2 Explaining altruism

Altruism has long been something of an evolutionary puzzle – how can a fitness-reducing behaviour be reconciled with the tenets of evolution and Darwinian natural selection? Similarly, economists view altruism as aberrant behaviour. From an economic standpoint all people should seek to maximise their own utility, that is, they should be concerned with ensuring that they derive maximal benefit from all situations: decreasing one's own utility in order to increase that of another individual is not economically rational. Accounts of altruism, therefore, often seek to find self-interested justifications for other-regarding behaviours.

A number of animal species show altruism. Social insects such as ants and termites will lay down their lives to protect the colony, birds will draw attention to themselves to warn the flock of a predator, while vampire bats regurgitate blood for members of the colony who have not successfully fed (Denault & McFarlane, 1995). It has been speculated that even microbes (West, Diggle, Buckling, Gardner, & Griffin, 2007) and plants (Murphy & Dudley, 2009) show altruistic behaviour towards their relatives. However, Hamilton's theory of kin selection (Hamilton, 1964) allows these behaviours to be interpreted within a fitness-

enhancing framework. Kin selection focuses on inclusive rather than individual fitness – an individual is successful when their genes, whatever their source (i.e. cousins, nieces/nephews, grandchildren, etc.) are transmitted to the next generation. This approach should mean that the greater the degree of relatedness between actor and recipient, the greater the likelihood of altruism, and this is indeed the case (Stewart-Williams, 2007; Webster, 2003).

Humans are nonetheless unusual in that they direct their altruism towards non-kin as well as kin. There are anecdotal reports of non-kin altruistic behaviour in animals (see Preston & de Waal, 2002) but as yet there is little empirical evidence to reliably support these. As such, many researchers have sought to explain why humans direct altruistic behaviours towards non-kin. Trivers (1971) developed the idea of reciprocal altruism, proposing that people will help non-kin if there is a chance of this being reciprocated in the future. While people do respond positively to people who have behaved altruistically towards them, people will nonetheless behave altruistically even if there is no chance of reciprocation (Burger, Sanchez, Imberi, & Grande, 2009; Nowak & Sigmund, 1998). Alexander (1987) distinguishes between direct reciprocity, where the recipient responds directly to the actor, and indirect reciprocity, where a third party responds to the actor. Indirect reciprocity therefore requires the third party to learn of the actor's reputation and respond accordingly; people are as such more likely to behave altruistically when they are observed (Hardy & Van Vugt, 2006).

Reputation formation is also used to explain altruism independently of reciprocity (Fehr & Fischbacher, 2003). While people want to develop and maintain a reputation for being a good person in order that people will respond in kind, some researchers also argue that reputation may have also a reproductive component. Roberts (1998) suggested that

altruism may be competitive – a means of signalling that one is a quality mate, comparing altruism to an advertiser offering free samples of a product in order to draw customers' attention to their products. It appears that this is successful as not only does altruistic behaviour confer status (Hardy & Van Vugt, 2006), but it also increases the perceived attractiveness of the actor (Farrelly, Lazarus, & Roberts, 2007).

Despite reputation and reciprocity providing compelling explanations of why people behave altruistically in public, they do not account for anonymous altruism (Hardy & Van Vugt, 2006). Andreoni has advanced an internal motive for altruistic behaviour: warm glow (Andreoni, 1989, 1990). He suggests that people derive utility from the act of altruism, that is to say that they experience a warm glow inside, arguing that altruism that is so motivated is impure altruism. People do appear to derive pleasure from altruistic behaviours, with increased activation in reward centres in the brain when making voluntary donations to the public good. However, consistent with the idea of pure altruism, people also experience pleasure even when donations are mandatory and therefore not attributable to the individual's actions (Harbaugh, Mayr & Burghart, 2007). Warm glow alone does not explain anonymous altruism (Konow, 2010).

Batson and colleagues acknowledge that altruistic responses do occur through a desire for reward, to avoid sanctions or to reduce personal distress. However, they also argue that altruistic behaviour is not always egoistically motivated and provide one of the few theories of altruism that incorporates the idea of pure altruistic motivation: the empathy-altruism hypothesis (Batson & Shaw, 1991). There are five stages to this empathic route to altruism. The individual first must identify the other's need through adoption of their perspective – this may occur through previous experience of a similar situation, through attachment to the victim or through instruction. This leads to an empathic emotional response, causing

the individual to be motivated to reduce the other person's need. The individual will then conduct a cost/benefit analysis of helping – if the benefit is sufficiently outweighed by the cost, the appropriate behavioural response will be considered and the action taken that results in the greatest benefit (it is possible that inaction may be the most beneficial response). A stronger empathic response, therefore should lead to a greater likelihood of altruism. Fultz, Batson, Fortenbach, McCarthy and Varney (1986) manipulated situational empathy by instructing participants to take the victim's perspective or be as objective as possible and found that empathy was positively associated with helping. This was the case even when their response was anonymous and so social evaluation was not a factor, leading the authors to conclude that altruistic helping is not driven by a desire to avoid negative social evaluation. Furthermore, the relationship was present both when the actor was forced to observe the victim's distress and when escape was easy and personal distress could be reduced without taking altruistic action. However, Cialdini et al. (1997) found that the relationship between the empathic concern and altruistic behaviour disappeared when oneness (the degree of overlap between self and other) was controlled. This means that altruistic behaviour driven by oneness is essentially helping the self rather than the other, casting doubt on whether the link between empathic concern and altruism is truly altruistically motivated.

1.2.3 Assessment of altruism

There are a number of methodologies that have been used to assess altruism in both adults and children, including naturalistic observations, situational tests, ratings and questionnaire measures. Naturalistic observations involve an observer watching the participant (generally a child) in her natural environment, such as at home or at school and recording every instance of the behaviour of interest within a defined period of time. While this method is time-consuming, it produces reliable results and is highly ecologically valid. Situational tests

involve putting the participant in a situation that may elicit the behaviour of interest and recording how she responds. Ratings require the participation of somebody who knows the participant well, such as a parent, teacher, peer or spouse. The rater is provided with a list of characteristics and asked to score the participant according to where on a continuum she falls for each characteristic. Questionnaire measures, on the other hand, involve asking the participant herself to record how often she enacts the behaviour of interest, or to rate herself for certain characteristics (Eisenberg & Mussen, 1989).

One potential criticism of situational studies, ratings and questionnaires is that they are susceptible to demand characteristics and social desirability bias, especially when the investigator directly interacts with the participant – she may be doing what she thinks is expected of her or may simply desire to please the experimenter. In contrast, observational group studies may reveal naturalistic prosocial and altruistic behaviours, but the absence of such behaviours may simply reflect the lack of an opportunity to demonstrate them rather than selfishness (Hay, 1994). In addition, it is impossible to disentangle the participant's natural altruistic tendencies from general prosocial behaviours that are cued by the presence of another individual or even direct requests from the other person – once again social desirability makes altruism impossible to distinguish from general prosocial behaviour.

Van Lange et al. (2007) suggest that experimental games may be less susceptible to social desirability than alternative methods. A number of recent studies have made use of a paradigm from experimental economics, the dictator game, which minimises the number of confounding motives present, thus allowing a closer approximation to true altruism and examination of the myriad influences on its expression.

1.3 The dictator game

The dictator game (hereafter DG) is a two-person economic game designed to examine altruism and fairness concerns (Camerer, 2003). It involves presenting a participant, the dictator, with an endowment of money and asking him to make an anonymous unilateral decision as to whether or not to allocate a proportion to another individual, the recipient. The recipient has no role other than to accept whatever is offered to them by the dictator. The 'rational' decision is for the dictator to keep all of the money as there is no external incentive to give anything away – there is no need for strategic offers and no chance of future reciprocity from the recipient as the interaction is one-shot, while the anonymity renders reputational concerns irrelevant.

The DG was originally created by Kahneman, Knetsch and Thaler (1986), who gave the dictator a choice between a 50:50 split and a 90:10 split in favour of himself (i.e. an equal division or an inequitable split in favour of the dictator). They found, contrary to their expectation of rational self-interest from the dictators, that 76% of participants chose an equal split. The procedure was subsequently modified by Forsythe, Horowitz, Savin and Sefton (1994) to the version commonly used today, where the dictator could make a free choice of the proportion of the endowment that they allocated to the recipient. Once more, participants violated the expectation of self-interest and allocated approximately 20% of their endowments to recipients, a finding that has since been replicated many times (see Camerer, 2003).

Allocating money to the recipient was initially viewed by economists as aberrant behaviour¹ and numerous modifications have been made to the DG in an attempt to extinguish this 'other-regarding behaviour'. Hoffman, McCabe, Shachat and Smith (1994) introduced a

¹ Indeed, Camerer & Thaler (1995) discussed DG behaviour in the *Anomalies* column of the Journal of Economic Perspectives

double blind procedure in which even the experimenters were unaware of the dictators' actions in addition to the dictator/recipient anonymity. While allocations were reduced by this increase in anonymity (referred to by the authors as social distance), they still were not completely extinguished. Johanesson and Persson (2000) further increased social distance by choosing recipients randomly from the telephone directory and anonymously posting allocations to their home address rather than having them located in an adjacent room to the dictator, as is standard in the DG. Allocations were further reduced to 9% of the endowment, but they did not significantly differ from those in a standard double blind procedure. Once again other-regarding behaviour was not extinguished, leading the authors to conclude that dictators' internal considerations are driving them to give away a portion of their endowment: it appears that an individual's altruistic propensity may be reflected in their DG donations.

The DG is now generally acknowledged as revealing the participant's altruistic tendencies as the dictator receives no benefit from sharing their endowment, aside from the 'warm glow' of giving (Camerer, 2003). It is ideal for empirically assessing altruistic behaviour as it requires the participant to make a decision of whether to benefit the recipient at a cost to themselves, while minimising the impact of factors that may cause participants to wish to appear altruistic. There are no reputation concerns or threat of repercussions as the experimenter is not aware of the dictator's decision and the recipient is not aware of the dictator's identity; this, along with the lack of self-report, also serves to attenuate the effect of social desirability. In addition, in the standard version, the dictator has no information about the recipient and so cannot be influenced by their 'deservingness' or their relationship to the dictator (see Camerer, 2003 for an in-depth review of the DG). It can be argued that the DG is the closest researchers have come to isolating 'pure' altruism as,

despite the numerous manipulations described below, no-one has yet completely eliminated donations in the DG.

1.3.1 Influences on DG behaviour

Since its creation 25 years ago, this incredibly simple and straightforward economic game had been the subject of extensive empirical manipulation. DG behaviour has been revealed to be remarkably easy to influence; indeed critics argue that this tractability renders inferences made from DG behaviour questionable, while supporters suggest that this is in fact a strength; this is discussed further in section 1.3.2. Camerer (2003) divides influences upon DG behaviour into five categories: demographic, cultural, methodological, descriptive and structural. He states that cultural and structural variables have the strongest effects, while the effects of methodological, demographic and descriptive variables are more modest. The influence of each type of variable is discussed below. While the studies described are by no means an exhaustive list of DG experiments, they give an indication of the scope of empirical manipulation available with the DG and the wide-ranging effects these manipulations have.

1.3.1.1 *Demographic variables*

Studies examining the influence of demographic variables compare the behaviour of people grouped according to their individual characteristics, such as gender, age or personality. Findings according to gender are mixed, with many studies finding no effect (e.g. Ackert, Gillette, Martinez-Vazquez & Rider, 2009; Benenson, Pascoe & Radmore, 2007; Bolton & Katok, 1995; Lucas et al., 2008). However, of those studies that find a significant effect of gender, females are consistently found to donate more of their endowment than males (e.g. Eckel & Grossman, 1998; Kamas, Preston & Baum, 2008; Gummerum, Hanoch, Keller, Parsons & Hummel, 2010; Gummerum, Keller, Takezawa & Mata, 2008; Harbaugh, Krause

& Liday, 2003). This difference has been attributed to females being more likely to be socialised to be prosocial and their behaviour being more context-dependent due to being more sensitive to social cues, creating higher variability in their DG behaviour than that of males (Croson & Gneezy, 2009).

Given the inconsistent effect of gender, it is perhaps not surprising that gender differences in DG behaviour appear to be dependent upon the precise composition of the study. Andreoni and Vesterlund (2001), for instance, found an interaction between gender and price, with DG behaviour differing depending upon the value of the units of the endowment. They manipulated the relative value of the units of the endowment to the dictator and the recipient: in some cases altruism was cheap as the dictator's allocation to the recipient was multiplied by a fixed value before being transferred to the recipient, while in others altruism was expensive as the dictator's allocation was divided by a fixed sum before being transferred to the recipient. When value was consistent (as is the case in the standard DG) or when altruism was expensive women donated more than men, while men donated more than women when altruism was cheap.

Cox and Deck (2005), on the other hand, examined how gender influenced DG behaviour when the economic and social cost of being generous were manipulated. 'Economic cost' refers to the absolute amount given up by the participant. Dictators were presented with a two alternative forced choice between keep everything and donate 37.5% of the endowment to recipient, with a low (\$20) or high (\$40) payoff. As the proportion given remained fixed, a higher payoff consequently meant giving up more money. Social cost refers to whether or not dictators' names were associated with their decisions. Compared to women, men were found to be more consistent in their donations across changes in cost and social distance, with no influence of these variables on their decision to donate.

Women, on the other hand, appeared more generous in low cost or low social distance situations, i.e. when their name was not associated with the decision and when there was less money to split. The authors argue that women are more responsive to certain environmental factors than men, in this case social distance and total income.

There is evidence to suggest that gender differences in altruism and prosocial behaviour may in part be genetic in origin. In a recent twin study of the heritability of prosocial behaviour, Son and Wilson (2010) found that women but not men inherit a tendency toward prosociality. Further to this sex-related genetic influence, individual somatic genes have been identified as contributing to altruistic behaviour on the DG. Polymorphisms in the genes for the neuroreceptors for oxytocin and arginine vasopressin, neuropeptides that contribute to social behaviour (Ebstein et al., 2009), have been shown to influence donations on the DG (Israel et al., 2009; Knafo, Israel et al., 2008). Expression of altruistic behaviour is clearly heritable to some degree.

Due to the simplicity of the game, the DG is increasingly used with children to examine how altruistic behaviour develops with age and donations are often found to increase over the course of childhood. Harbaugh et al. (2003), for instance, found that 7-18 year-olds' donations increased by 2% with each additional year, while Benenson et al. (2007) found that donations increased between 4 and 9 years of age. Furthermore the relationship between age and DG donations appears to continue throughout adulthood, with older people being more generous (Carpenter et al., 2008). However, a significant age effect is not always observed. Gummerum et al. (2008) found no change in behaviour with 8-17 year-olds, nor was a significant difference observed across 3-5 year-olds by Gummerum et al. (2010). Nonetheless, children as young as 3 years of age have been demonstrated to make donations in the DG (Gummerum et al., 2010), demonstrating that even preschoolers

are able to act altruistically. A more in-depth discussion of the DG in children can be found in sections 2.1.2 and 3.1.3.

Whilst religiosity has been found to be associated with self-reported prosociality (Norenzayan & Shariff, 2008) it has not been found to reliably predict observed prosocial behaviour, as described in section 1.1.2.2. Shariff and Norenzayan (2007) found that this was also the case with the DG. They argue that the religious situation provides a more reliable predictor of DG behaviour than an individual's religious disposition. Prior to participating in a one-shot DG, they presented participants with neutral, religious or secular primes. Implicitly activating religious concepts significantly increased donations compared to donations that followed the neutral prime. The authors suggest that increasing the salience of 'morally concerned deities' reduces the anonymity of the situation and potentially implicitly raises reputational concerns. Interestingly, activation of secular concepts increased donations to a similar extent to religious concepts. This supports the argument that rather than religiosity per se being important in altruistic behaviour, simply increasing the salience of others (whether deities or other people) significantly influences DG behaviour.

Consistent with the findings with general prosocial behaviour discussed above (see section 1.1.2.1), altruistic behaviour in the DG is related to an individual's personality. As might be expected, people who have a Prosocial SVO donate more in the DG than those with a Competitive or Individualist SVO (Israel et al., 2009). Big Five personality traits also appear to influence DG donations, with Agreeableness being positively correlated with donation size, while the effects of other personality variables differ by gender: donations are negatively correlated with Extraversion in males only while they are negatively correlated with Conscientiousness and Neuroticism in females only (Ben-Ner, Kong & Putterman,

2004). Ben-Ner and Kramer (in press) find that these personality effects only obtain when donating to non-kin. Personality does not seem to influence donations to kin, which they suggest supports the notion that kin altruism is hardwired and so shows fewer individual differences.

1.3.1.2 Cultural variables

Dictator games are typically conducted with Western university students. As such, the consistency in donations in a standard DG is hardly surprising; however, when the behaviour of people from different cultures is examined, findings are more variable. Henrich et al. (2010) conducted DGs in small-scale societies across the world and found that while no society was completely selfish, performance varied widely across cultures. DG offers were positively correlated with the level of market integration of the society (as assessed by the amount of food that is purchased rather than gathered, cultivated or hunted; the higher the market integration, the greater the proportion of food that is purchased); indeed, market integration accounted for at least 52% of the variance in mean DG offers. Henrich et al. (2005) argue that other-regarding behaviours are a product of an individual's economic and social environment, and so depend upon social norms.

Gowdy, Iorgulescu and Onyeiwu (2003) interviewed DG participants in rural Nigeria about their reasons for sharing after they had made their divisions. This society, the Igbo, have a strong sharing norm and members made a mean offer of 42%, much higher than they typically observed in the West; fairness concerns were often cited as reasons for giving. Conversely, Marlowe (2004) conducted the DG with the Hadza in Tanzania. These hunter-gatherers have a highly egalitarian society that is characterised by a great deal of sharing, yet the mean allocation of 20% was no higher than that typically observed in the West. Marlowe suggests that the Hadza were taking advantage of the anonymity that is not

usually available in their society and so chose not to share as often as might be expected. Whether DG behaviour in societies where anonymity is rare (and often impossible) can be generalised to general prosocial behaviour within that society is not clear. Gurven and Winking (2008) found no relationship between standard DG performance and prosocial behaviours such as food sharing in the Tsimane forager-horticulturists of Bolivia: it seems possible that the DG situation is simply too alien to be indicative of behaviour in a more natural setting in these small-scale societies.

1.3.1.3 Methodological variables

Methodological variables alter the way in which the experiment is conducted whilst maintaining the original DG structure. As described above, increasing social distance by increasing the anonymity of the dictator reduces DG donations (Hoffman et al., 1996; Johannesson & Persson, 2000) but there are a number of additional methodological variables that influence DG giving. For instance, compared to standard DG performance, donations are reduced by causing the dictator to feel that he cannot be observed by conducting the DG in the dark (Zhong, Bohns, & Gino, 2010). Conversely, giving the impression of being observed will increase DG donations, even when no actual observation occurs. Burnham (2003) demonstrated that when dictators viewed a photograph of their recipient prior to making their allocation, they were more likely to divide the endowment equally than when no photo was provided. Furthermore, donations did not differ between treatments where the dictator received a photo of the recipient and where recipients received a photo of the dictator, confirming that it is the perception of privacy that is important. Burnham argues that having a photograph of the recipient not only increases empathy with the recipient, but makes a private situation feel more public, causing participants to behave as if they were being watched.

The influence of perceived observation is not limited to photographs of the participants, or even faces in general. When participants were taking part in a computerised DG, Haley and Fessler (2005) presented a set of stylised eyespots or a neutral backdrop on the desktop of the computer. They found that participants donate more often when they were 'watched' by the stylised eyes, suggesting that this provides a cue of observability, making people behave as if their actions have reputational consequences. When donations were made to ingroup or outgroup members, Mifune, Hashimoto and Yamagishi (2010) found that there was an ingroup bias in eyes condition only, with no difference in ingroup and outgroup donations in the control condition. They suggest that the 'eyes' function as a cue for the presence of monitoring by community members, giving the impression that the dictator's behaviour may influence their reputation and so donations consequently increase to the ingroup. Even a 'weak social cue' of three dots in a vaguely face-shaped configuration is sufficient to increase donations in comparison to three dots presented in a neutral configuration (Rigdon, Ishii, Watabe, & Kitayama, 2009). While gender did not influence the increase in donations when the cues were eye-shaped (Haley & Fessler, 2005), when the cues were more abstract and thus weaker, men but not women showed an increase in donations from baseline. This was because women were more generous than men in the control condition – men seem to have exploited the double blind nature of the control condition, while the recipient appears to have already been salient to women in the control condition and so their donations did not show a further increase when presented with weak social cues (Rigdon et al., 2009).

In the DG the endowment is generally bestowed upon the dictator as a windfall. Windfall money is more likely to be spent than earned money (Arkes et al., 1994; Cattelino, 2009; Thaler, 1999), an influence that appears to contribute to DG donations. When participants earn the endowment (usually by performing a mundane task) that they are then asked to

divide between themselves and the recipient, they are both less likely to donate and give less when they do so (Carlsson, He, & Martinsson, 2010; Cherry, 2001; Cherry, Frykblom, & Shogren, 2002; List & Cherry, 2008). Cherry and colleagues argue that participants that have earned the money to be allocated have a more legitimate right to that money than those that simply have it bestowed upon them and therefore are less likely to share it with the recipient (Cherry, 2001; Cherry et al., 2002; List & Cherry, 2008). Dictators do appear to take into account the recipient's right to the money as well as their own, as they will give more when the recipient has earned the endowment that the dictator is dividing (Oxoby & Spraggon, 2008); further discussion of the influence of earning the endowment can be found in section 4.1.2.

One variable that appears to have little influence upon DG behaviour is stake size. Numerous studies have varied the size of the endowment, and allocations have been shown to be independent of endowment size (Carpenter, Verhoogen & Burks, 2005; Cherry et al., 2002; Forsythe et al., 1994; Harbaugh & Krause, 2000; List & Cherry, 2008), even when endowment size is increased tenfold (Carpenter et al., 2005): it appears that people prefer to donate a set proportion of their endowments rather than an absolute amount.

1.3.1.4 Descriptive variables

Manipulation of descriptive variables changes how the DG is described to the participant without changing its structure. Researchers are very careful when designing DG studies to ensure neutrality in their experimental instructions, as even small changes in wording can have a large effect upon donations. Any information participants receive generally avoids using the term 'game', despite this being the terminology used in the literature. This is because using the word 'game' raises the idea of the participant being a player, whose purpose is to win. Indeed, when questioned after making their allocations about how they

viewed the DG, participants who were more oriented towards approaching it as a game donated less of their endowment (Frohlich, Oppenheimer, & Moore, 2001).

In order to explore the power of framing of the experimental instructions, Brañas-Garza (2007) added just one extra sentence: “Note that your recipient relies on you”. This sentence reduced the neutrality of the situation without influencing the anonymity of dictator or recipient, reminding dictators of the unfairness of the DG situation (as the recipient has no power), and thus increasing the moral cost of selfishness. In comparison to donations when this sentence was not included, donations in the framing DG were significantly higher, with fewer zero donations. The authors concluded that adding information adds context to the dictator’s donation decision, thus motivating altruistic behaviour.

In addition to increasing anonymity methodologically through implementing a double blind procedure or decreasing it through having the dictator view the recipient (or vice versa), anonymity can also be manipulated descriptively. For instance, informing the dictator of the recipient’s reputation increases donations, even when there is no opportunity for future interaction. Dictators donate more when they are informed of their recipient’s decision in a previous, unrelated DG than when they are given no information about the recipient, while the amount donated is positively correlated with their partner’s previous donations: people appear to reward generous behaviour. Moreover, even recipients who had previously been only mildly generous or even selfish receive more than those whose prior behaviour was unknown (Fehr & Schneider, 2010; Servátka, 2009, 2010).

Demographic information about the recipient also influences giving in the DG. People often give more to members of their ingroup than to strangers or outgroup members and more

still to kin, most likely because as ingroup and family members are most likely to have the opportunity to reciprocate in the future (Ben-Ner & Kramer, in press; Ben-Ner, McCall, Stephane & Wang, 2009; Bernhard et al., 2006), although Fershtman and Gneezy (2001) found no evidence for discrimination in against outgroup members in a sample of Israeli Jews. While it is generally accepted that people are more altruistic towards kin than non-kin, this has rarely been directly examined using the DG. In the one study to date to do so, Ben-Ner and Kramer (in press) asked participants to make hypothetical DG divisions between various individuals described by only one feature (e.g. 'tall' or 'your brother-in-law'). They found that participants made the largest mean offer, the fewest zero offers and the most offers over 50% towards kin, followed by collaborators, then neutrals and then competitors. This is consistent with the notion that preferentially helping kin is fitness-enhancing (Hamilton, 1964).

When Eckel and Grossman (1996) described the recipient as a charitable organisation rather than an anonymous individual donation size trebled, increasing from 11% to 31%. When more information is provided this increase in generosity is even more startling. Brañas-Garza (2006) found that when dictators were informed that their recipient was from a poor, underdeveloped country and that the money could be very useful there, donations increased from 10% at baseline to 66% of the endowment. When, in addition to this information, dictators were informed that the money would be spent on medicines and that the medicines would be of great help, donations further increased to 80%, with the entire endowment being donated by 71% of participants; this is particularly noteworthy given that donations of the full amount are almost unheard of in the standard DG.

1.3.1.5 Structural variables

The structure of the dictator game can be changed by adding moves (Camerer, 2003). This can occur in a number of ways, such as changing the dictator's response set and allowing him to take money as well as give it (Bardsley, 2008; List, 2007; see section 1.3.2), changing the response set of the recipient and allowing him to reject the dictator's offer (i.e. making the game an Ultimatum Game, see Camerer, 2003 for a review) or introducing additional players (e.g. Ben-Ner, Putterman, Kong, & Magan, 2004). Given the simplicity of the structure of the standard DG, modification generally results in a radical change in the game and thus the type of behaviour elicited by it.

Ben-Ner, Putterman et al. (2004) added an extra round to the DG. They allowed recipients from the first round to become dictators in the second round, half of whom were paired with their original partner (i.e. had the opportunity to give to the person who had/had not given to them) and the other half were paired with a different individual. Behaviour in the second round was correlated with the allocations the individual had received in the first round, with a stronger correlation occurring when the second round dictators were donating to their first round partners than when they were giving to an unknown person. This behaviour is evidence of reciprocity: when giving to a new partner the reciprocity is indirect as they have not previously interacted, while when giving to a previous partner the reciprocity is direct, thus producing a stronger correlation.

Simply changing the dictator's partner from passive 'recipient' to active 'responder' is sufficient to dramatically alter behaviour. In an economic game known as the Ultimatum Game (UG) the first-mover is a proposer, who suggests a division of the allocation to the Responder. In contrast to the DG, the responder has two options available to him: either accept the division of the endowment or reject the offer. However, rejection of the offer means that neither party receives anything and so neoclassical economic theory would

suggest that the rational responder would accept any amount, as receiving something is better than receiving nothing. Nonetheless, responders often punish offers that they consider too low, and so tend to reject offers of less than 20%. Proposers consequently offer more than in the standard DG, typically dividing the endowment equally in a strategic move to avoid rejection (Camerer, 2003). The UG was in fact the basis of the first DG conducted by Kahneman et al. (1986): the DG was a means of ascertaining the degree to which offers in the UG were strategic and whether altruism played a part in divisions.

It is clear that addition of one small step to the DG procedure adds a great deal of complexity to the decision-making process and the motives underlying it. It is believed that people's tendency to punish others as observed in the UG is not just revenge, but also a means of enforcing social norms, and it is observed to varying extents in cultures around the world (Gintis, 2003b; Henrich et al., 2005; Henrich et al., 2010). Indeed, unaffected third parties are also prepared to bear a cost in order to punish a norm violator, a practice termed 'altruistic punishment' (Fehr & Fischbacher, 2004), although there is imaging evidence that people take pleasure in punishing norm violators (de Quervain et al., 2004).

1.3.2 Criticisms of the DG

One criticism levelled at the DG as a means of assessing altruism is that there is no opposing behaviour available – participants can give something or nothing but they do not have the opportunity to take additional resources. Apparently altruistic behaviour may therefore be an artefact of the experimental design, a product of demand characteristics due to a situation in which the only options are to give or do nothing. Bardsley (2008) states that if people are disposed towards altruism then this characteristic should be revealed even if the opportunity to take from the receiver is offered. He found that giving was greatly reduced by simultaneously presenting the opportunity to take, although giving

was not eliminated entirely; indeed, even when taking was the only option 17% of participants still chose to take nothing.

List (2007) systematically reduced the incidence of DG donations by introducing varying options to take from the recipient, arguing that if a preference for other-regarding behaviour were driving standard DG behaviour then donations should be unaffected by this increase in response options. In comparison to the baseline, donations were reduced by adding the option to take \$1, and the option to take \$5 saw a further drop in donations. By far the greatest reduction in donations was caused by giving the dictator the opportunity to take \$5 when both participants have first earned their money. However, while the incidence of giving was drastically reduced by introducing taking options, when donations were made they were approximately the same size as in the standard DG. Furthermore, despite taking increasing between the \$1 and \$5 taking conditions, the majority of dictators neither gave nor took in the earnings treatment, arguably because each participant is viewed as having a legitimate right to their own money when it has been earned (see section 1.3.1.3). List suggests that participants are inferring social norms from the context of the game, thus when taking is an option it is acceptable not to be generous but when taking is not an option it is less acceptable to be selfish. Nonetheless, even when the choice set is expanded to allow taking, people are not uniformly selfish: altruistic behaviour appears to stubbornly refuse to be extinguished.

Levitt and List (2007) explain the importance of the taking DG as follows: “Real-world contexts typically offer the option of both giving and receiving, which may help to explain in part why, contrary to the lab environment, people rarely receive anonymous envelopes

with cash inside.”² (Levitt & List, 2007, p. 167). However, this experimental design may be even less ecologically valid than that of the standard DG, as it essentially condones theft. While taking is an available option in the real world it is not generally acceptable in larger society and bears a risk of sanctions. Giving, on the other hand, is rarely deemed unacceptable (although being too generous is sometimes punished, see Henrich et al., 2005). A more representative version of the taking DG would perhaps involve being allowed to give freely but taking carrying a risk of punishment: taking would most likely be far less prevalent.

While the taking DG may not be any more ecologically valid than the standard DG, it nevertheless provides further evidence of how susceptible the DG is to manipulation (see section 1.3.1). This changeability, however, should not be viewed as preferences being unstable and driven by experimenter demand but rather that changes to the experimental situation lead to predictable and systematic changes in behaviour (Levitt & List, 2007; Rigdon et al., 2009). As such, DG behaviour does not reflect a lack of robustness, but simply a lack of context (Frohlich et al., 2001), which thus gives little indication as to which particular social norm should be followed when making a division. Guala and Mittone (2010) therefore argue that the DG is ideal for assessing social norms rather than individual differences in preferences, as by adding information (or taking it away in double blind studies) a particular social norm is activated, leading to predictable behavioural changes. In its standard form, however, they believe that the DG is too abstract to trigger everyday normative behaviours.

Given these concerns over the lack of context inherent in the DG, it is perhaps surprising that it does appear to reflect naturally-occurring charitable behaviour: student’s behaviour

² One of the major differences between the lab environment and the real world is arguably that it rarely spontaneously occurs to people to send out anonymous envelopes with cash inside.

on a standard DG task with a charity recipient is related to both their past and future incidence of donation to a university social fund (Benz & Meier, 2006). Furthermore, the standard use of a student volunteer sample appears to underestimate altruism in the population as a whole. Eckel and Grossman (2000) compared DG donations to a charity by volunteers (i.e. participants recruited in the normal fashion) and pseudo-volunteers (i.e. students asked to remain after a lecture to complete the study). Pseudo-volunteers, who did not initially intend to take part in the study, were more generous than volunteers; furthermore, volunteers were more likely to request acknowledgement for their donations, suggesting a greater desire for the warm glow of giving. Pseudo-volunteers also showed a greater influence of individual characteristics such as gender and self-reported altruism than did true volunteers. Similarly, Carpenter et al. (2008) conducted a 'representative' DG, which was intended to be representative both in terms of the task and the sample. Members of the wider community chose a charity to support and how much of a \$100 endowment to donate, which was compared to students' behaviour in the same situation. Community members donated more to charity than students and were more likely to donate the entire sum, while age and sex were the most robust predictors of allocations with younger people being more selfish and male students being especially selfish. Together, these findings suggest that the DG not only reflects more general altruistic tendencies, but also that people who volunteer for economic studies are, if anything, likely to underrepresent the altruistic tendencies of the population as a whole.

1.3.3 The DG as a measure of altruism

Despite the DG being used as a measure of altruism and DG behaviour showing a relationship with prosocial behaviour more generally, it is not universally accepted that DG behaviour reflects altruism. A number of alternative factors have been advanced to explain

DG behaviour and while these factors do not entirely preclude the contribution of a preference for altruism, they generally have self-interest at their root.

Despite the standard DG being a one-shot game with no chance of reciprocity or future interaction, some authors argue that participants behave as if there will nonetheless be repetition of the game. Levitt and List (2007) suggest that due to the fact that anonymous one-shot interactions are unlikely in the real world, some people are unable to moderate their behaviour and so nonetheless behave as if they will build a reputation through their actions. There is certainly evidence that people give because they do not wish to appear selfish, even under anonymous conditions. Dictators will sacrifice 10% of their endowment to exit without the recipient knowing about the experiment and that the dictator did not share with them (Dana, Cain, & Dawes, 2006). Indeed, the dictator could have given \$1 to the recipient and kept the remaining \$9 – this would have achieved the same monetary outcome to the dictator and would have been more beneficial to the recipient. Furthermore, people in a private DG, where the recipient doesn't know where the money comes from, generally choose not to pay to exit the game. Dana et al. (2006) suggest that reputation concerns are not necessarily consciously considered but rather are automatically implemented and so still exert an influence even under conditions of anonymity.

Andreoni and Bernheim (2009) note that donors in the DG frequently give exactly half of the endowment and suggest that this reflects a 50-50 norm. They argue that people wish to appear fair and so adhere to this norm in the DG; indeed, people were more likely to split the endowment equally when anonymity was reduced. Internalised social norms, which can drive an individual's behaviour even in the absence of external observation through internal sanctions (Perugini et al., 2003; Schwartz & Howard, 1980) are often advanced as explanations for DG behaviour. Indeed, it is argued that norms are the factor that

distinguishes humans and their non-kin directed altruism from animals and their kin-directed altruism (Clavien & Klein, 2010). Guala and Mittone (2010) argue that the lack of context indicating which social norm is appropriate in the DG causes people to apply their own norms. As such, people who have an internal norm of altruism are more likely to behave altruistically in the context-poor standard DG. Camerer and Thaler (1995) state that DG behaviour is less altruism and more manners, arguing that people leave a tip in a restaurant that they have no intention of visiting again simply because it would be rude to do otherwise and that DG behaviour is no different.

Murnighan, Oesch and Pillutla (2001) recognise that people do not respond uniformly in the DG. They propose that dictators can be divided into three categories: rational dictators (who take the maximum amount), equal dictators (who favour an equal split) and reluctant dictators (who give an amount between zero and half). They argue that rationals and equals will not be influenced by restrictions of the choice set, as rationals will always behave selfishly and equals will give half if that is an option. Reluctants, on the other hand, will be generous when there is free choice to do so and selfish when their choices are restricted. This is because they seek to optimise their impression of themselves and so are generous when only they are responsible for the amount given, but when the choice set is restricted by the experimenter then they can excuse their own greed as they have been 'forced' to behave that way by the experimenter. Reluctants, they suggest, seek to show themselves in a positive light, if only to themselves, and experience a warm glow from behaving in a manner consistent with their generous self-impression.

Consistent with the idea of self-impression management, when the relationship between dictators' actions and recipients' outcomes was unclear, dictators were more selfish (Dana, Weber, & Kuang, 2007). It appears that many dictators give because they do not want to

appear unfair, not just to the recipient but to themselves. However, while the flipside of maintaining a positive self-impression is avoiding guilt, guilt aversion appears to have minimal impact upon DG behaviour. Ellingsen, Johannesson, Tjøtta and Torsvik (2010) asked recipients to predict what they would receive and provided this information to dictators prior to making their division. They argue that guilt aversion would predict a positive correlation between recipients' expectations and dictators divisions; however, this was not the case.

It seems a reasonable assumption that which of the numerous factors outlined above contribute to behaviour in the DG depends on the individual in question and multiple factors most likely interact simultaneously to influence the outcome. Whether these factors act in addition to altruism, or simply give the appearance of altruism is as yet unresolved. However, at this point it is germane to return to the original definition of altruism as it is considered in this thesis: enactment of a behaviour that is beneficial to the recipient but costly to the actor. DG behaviour clearly falls into this category, whether or not the dictator feels a warm glow, mistakenly feels that his reputation will be enhanced, wishes to see himself as a good person, or he simply is blindly following a social norm that he has internalised and can no longer escape. More speculatively, it is worth bearing in mind that the presence of any or even all of the factors described above does not automatically discount the presence of an altruistic motive. As already stated, the DG does not and cannot discern the motives behind donation behaviours in and of itself. While clever manipulations have enabled the isolation of influences on and moderators of altruistic behaviour, their presence does not invalidate that of altruism. Humans and their motives are ultimately complex and in many ways inscrutable.

In comparison to other methods used to examine altruism (see section 1.2.3), the DG lacks ecological validity due to its anonymity and lack of interaction involved. However, this allows the impact of factors outside the individual to be minimised, allowing examination of apparently altruistic behaviour. Whether the DG truly reflects altruism or a combination of the factors listed above (i.e. guilt, etc.) is contentious, but its use at least allows consideration only of the participant's internal motives. The DG allows consideration of altruistic behaviour to be undertaken in an empirical fashion, removing as many extraneous influences as possible before systematically varying influential factors and observing their effect upon resultant behaviour.

1.4 Aims of the thesis

Prosocial and altruistic behaviours have been demonstrated to increase with age, yet few studies have used a behavioural measure to assess preschool children's altruistic abilities. The DG is a very simple task that is suitable for use with very young children, but as yet the influence upon their altruistic behaviour are largely unexplored despite DG behaviour being known to be influenced by numerous factors. This thesis will examine the influence of demographic, methodological and descriptive factors upon the DG behaviour of 4-5 year-old children. This age group is particularly interesting as preschool children are just beginning to expand their social circles as they start nursery or school, allowing exploration of the degree to which children display early tendencies towards altruism that may not be driven by social experience. Furthermore, examination of how altruistic behaviour is moderated at this young age, as well as its stability into adulthood, can help to inform our understanding of some of the driving factors behind altruism.

Chapter 2 will investigate the impact of individual differences upon 4-5 year-olds' DG performance, focussing on the influence of sibling status but also exploring the influence of gender, mathematical ability, theory of mind ability and time spent with peers. In order to

ensure that a developmental increase in altruistic behaviour in the DG is not due to young children having a poor understanding of the task, steps will be taken to ensure that cognitive demands are minimised. Chapter 3 will directly explore whether adults' DG behaviour is comparable to that of children and will also examine whether any sibling influence is stable into adulthood or simply a consequence of being in the familial context. Chapter 4 examines methodological influences on 4-5 year-olds' DG behaviour by examining the influence of earning the endowment and whether these young children employ a legitimacy norm to excuse selfishness. Chapter 5 explores descriptive influences upon DG behaviour by assessing whether 4-5 year-old children are able to take reputational information into account and implement an indirect reciprocity norm according to the valence of the recipient's reputation. The influence of reducing anonymity by providing information will also be explored. Finally, Chapter 6 will provide a summary of the findings of the thesis and a general discussion of the themes that have emerged across the chapters.

In sum, the aims of the present thesis are as follows:

- To examine prosocial behaviour, specifically altruism, using a behavioural measure (all chapters)
- To make the task as simple as possible for such young children by minimising the cognitive demands (all chapters, specifically Chapter 2)
- To examine how environmental influences, particularly siblings, influence the expression of altruism (all chapters, specifically Chapters 2 and 3)
- To examine how gender influences the expression of altruism (all chapters)
- To examine the stability of the sibling influence with age (Chapter 3)
- To explore how the origin of the endowment influences children's altruistic behaviour (Chapter 4)

- To discover whether children's altruistic behaviour is influenced by reducing the anonymity of the recipient (Chapter 5)
- To explore how the characteristics of the recipient influence altruistic behaviour (Chapter 5)

Chapter 2: Sibling status and the dictator game in preschool children

2.1 Introduction

The prosocial behaviour of altruism is susceptible to the influence of a variety of factors such as reputation formation, knowledge of the recipient, reciprocity and social desirability (see Chapter 1 for a full discussion of influences upon altruistic behaviour). However, much of the literature examining altruism in children involves studies that do not control for these influences, rendering unclear the extent to which pure altruism is shaping behaviour. Fewer still are studies that both control these variables and examine the effect of individual differences such as birth order (Fehr et al., 2008). The present study made use of the dictator game in order to establish how birth order, independently of other individual differences such as socio-economic status, influences pure altruistic behaviour.

2.1.1 The influence of siblings

There are a number of factors, both genetic and environmental, that have been observed to influence both adults' and children's prosocial and altruistic behaviour. One significant feature of a child's environment that has been little-investigated in the prosocial literature in recent years is the presence or absence of siblings and a child's position within the sibling constellation. While parents make an important and obvious contribution to their child's development, in the preschool years a child is likely to spend far more time with their siblings than their parents (Abramovitch et al., 1979; Bank & Kahn, 1975). Opinion as to the degree of influence a sibling has on their co-sibling's development is divided. Researchers such as Frank Sulloway argue that siblings are hugely influential on development, stating in his controversial book *Born to Rebel* that birth order is an influential factor in the revolutionary spirit of a number of historical figures, over and above the influence of socio-economic status (SES) and gender. He finds that firstborns are conservative and identify

with authority, while laterborns are rebellious and liable to flout authority in pursuit of their beliefs and interests (Sulloway, 1996). In stark contrast, Ernst and Angst (1983) find in their survey of studies of siblings' influence on educational attainment and personality that almost all relationships can be explained by poor research design and confounding factors such as SES and home disruptions such as parental divorce. Harris (2000) concludes her discussion of birth order effects with the opinion that "Birth order affects the way we behave with, and feel about, our parents and siblings. These behaviors and feelings are left behind, along with other mementos of our childhood years, when we leave home" (Harris, 2000, p. 177). In other words, whatever effects birth order may have on behaviour, they are limited only to interactions within the family and disappear altogether when no longer in a family situation.

Despite these conflicting and often negative opinions on the influence of birth order on a child's development, a large number of recent studies have found it to have a significant impact in a variety of domains, the direction of the effect depending upon the domain in question. Being firstborn appears to be beneficial to cognitive ability, with educational attainment (Black, Devereux, & Salvanes, 2005; Saroglou & Fiasse, 2003), adults' episodic memory (Holmgren, Molander, & Nilsson, 2007) and preschoolers' verbal ability (Heiland, 2009) decreasing the later in the sibling constellation the child is born. Being laterborn can be beneficial to motor skill, with older siblings being present facilitating a toddler's attainment of motor milestones and gross motor production (Berger & Nuzzo, 2008; Reid, Stahl, & Striano, 2010). Personality, as measured on Costa and McCrae's (1992) five factor model (NEO-PI-R), also appears to be influenced by birth order. Sulloway (1996), in his meta-analysis of the studies in Ernst and Angst's (1983) survey (who concluded that there was no influence of birth order), found that compared to laterborns, firstborns were high in Conscientiousness and Neuroticism and low in Openness to Experience and Agreeableness,

although Extraversion did not show a clear effect. Consistent with these findings, other authors have found firstborns to be more Conscientious (Healey & Ellis, 2007; Paulhus, Trapnell, & Chen, 1999) and laterborns more Agreeable and Open to Experience (Jefferson et al., 1998; Paulhus et al., 1999).

The majority of studies that find a relationship between cognitive ability, motor skill or personality and birth order find that their results are consistent with each other in terms of the direction of the effect. However, not all studies find a significant sibling effect. Jefferson et al. (1998), for instance, find no difference between firstborns' and laterborns' self-report on the broad domains of the NEO-PI-R (although laterborns did score higher on the subscales of altruism and tendermindedness). In their attempt to replicate Sulloway's (1996) findings, Michalski and Shackelford (2002) find very little difference in personality between firstborns and laterborns: they only vary in terms of Agreeableness (laterborns are more agreeable) and Openness (firstborns are more open to experience). In agreement with Ernst and Angst (1983), Rodgers, Cleveland, van den Oord and Rowe (2000) state that birth order effects in between-family studies are confounded with factors such as SES and maternal age and that any relationship between intelligence and birth order is simply a methodological artefact. Downey and Condrón (2004) report similar conclusions, with no relationship between possession of siblings and cognitive skill once SES and family characteristics are controlled for. However, they did find that possession of at least one sibling conferred an advantage in social skills to US kindergartners, with children with siblings having better interpersonal skills and self control than those without.

In addition to Downey and Condrón's (2004) findings in American kindergartners that singletons are at a social disadvantage, US preschoolers' social-emotional competence has been found to benefit from having siblings no more than 30 months older than the child

and who show positive emotional responsiveness to their younger siblings (Sawyer et al., 2002). Kitzmann, Cohen and Lockwood (2002) compared the popularity and acceptance with their peers of 6-12 year-old singletons (i.e. children without siblings) to that of firstborn and secondborn children. They found that singletons were less popular and less well-accepted by their peers than children with siblings, the discrepancy being larger with secondborns than with firstborns, suggesting an additional benefit of possessing older siblings. The effect of siblings on social development appears to be in quite the opposite direction to that found in cognitive ability: possessing siblings appears to boost social skills.

Findings with theory of mind (ToM) ability are more mixed, with some studies finding no influence of birth order (Cole & Mitchell, 2000) or family size (Peterson & Slaughter, 2003). However, children's ToM ability has been demonstrated to benefit from the possession of both older and younger child-aged siblings (McAlister & Peterson, 2007), while a study comparing twin pairs with and without additional siblings suggests that it is spending time with a child of a different age, creating a mismatch in perspectives, that provides the benefit (Cassidy, Fineberg, Brown, & Perkins, 2005). Other studies find that a larger family size accelerates ToM development (Jenkins & Astington, 1996; Perner, Ruffman, & Leekam, 1994), while Ruffman, Perner, Naito, Parkin and Clements' (1998) re-analysis of Perner et al.'s data, which showed a general advantage to possessing siblings, suggests that it is older siblings in particular that are beneficial. This finding has recently been supported by Farhadian et al. (2010), who found secondborns to have an advantage over firstborns in ToM ability. Older siblings have also been found to impact a child's empathy: Tucker, Updegraff, McHale and Crouter (1999) found 10-12 year-olds' empathy to be increased by having an empathic older sibling, a relationship which is not reciprocal – younger siblings did not have a significant effect on their older siblings' empathy. The authors note that the

abilities required for empathy also contribute to prosocial behaviour, implying that possession of older siblings may also be beneficial for a child's prosociality.

The influence of siblings upon altruism and prosocial behaviour has rarely been investigated, but there are indications that being a laterborn (i.e. possessing older siblings) may boost prosociality. Given that laterborns have been shown to score higher than firstborns on Agreeableness, it is interesting to note that Carlo et al. (2005) found this personality dimension to be related to volunteerism in a sample of college students. Indeed, as mentioned earlier, Jefferson et al. (1998) found laterborns to score significantly higher than firstborns on the altruism facet of Agreeableness, while Saroglou and Fiasse (2003) examined first-, middle- and lastborns independently and found lastborns to score significantly higher on the altruism facet than both middleborns and firstborns.

Van Lange et al. (1997) investigated the relationship between both adults' family size and possession of older siblings and their social value orientation (SVO), defined as a person's preferences for a balance in outcome between themselves and others. SVO is assessed using Van Lange et al.'s (1997) Triple-Dominance Measure of Social Values, a decomposed game in which the participant makes choices between three options of how to allocate sets of points. Those that seek the best outcome for all concerned are classified as prosocial (i.e. equal distribution of points), while those who care only about their own outcomes are classed as individualistic (i.e. seek to maximise their own points irrespective of what the other receives). People who prefer to maximise their own outcome in comparison to that of others are competitive (i.e. seek to acquire more points than the other, even if they could acquire more points for themselves by making a different choice). Prosocials were found to have significantly more siblings than both competitors and individualists. The authors suggest that this is consistent with their sibling-prosocial hypothesis that possessing more

siblings leads to a greater chance of experiencing conflicts of interest and the necessity to share resources. Children therefore learn the benefits of cooperation and develop a prosocial SVO. Prosocials were also found to possess more older siblings: laterborns have always possessed siblings and are more likely to have a greater number of siblings than firstborns, who have spent some of their childhood without siblings – indeed, they may never acquire more siblings³ – and, the authors argue, are therefore less likely to develop a prosocial SVO.

While it is interesting that siblings appear to influence an individual's SVO, it does not necessarily follow that this will translate into more prosocial or altruistic actions. There is some evidence that SVO and prosocial actions are related. For example, Van Lange et al. (2007) took measures of participants' SVO and self-reports of donation behaviour, finding that prosocials donated more often and to a greater variety of causes than both individualists and competitors. In addition, as well as assessing their adult participants' SVO, Israel et al. (2009) asked them to take part in the DG (see section 1.3 for a full description of the DG), in which the amount given away is thought to reflect an individual's level of altruism. Performance on the two tasks was related: after dividing their participants into high and low allocators depending upon their donations in the DG, prosocials were found to be more likely to be high allocators: 65% of prosocials were high allocators while only 27% of proselves (i.e. competitors and individualists) were high allocators. Thus, this suggests the possibility that Van Lange et al.'s (1997) findings of a birth order effect on SVO may also be observed upon donations in the DG.

As yet there appears to have been only one study that has directly assessed the impact of siblings upon a behavioural measure of altruism in children. In their study of inequality

³ Van Lange et al. (2007) included singletons in their firstborn group.

aversion in 3-8 year-olds Fehr et al. (2008) conducted three different games in which children had to make a choice between two potential divisions of sweets. In their sharing treatment, which the authors consider to be equivalent to a mini DG, the child must decide whether to choose one sweet for themselves and one for another individual, or to keep both sweets for themselves. Fehr et al. note that the decision to share is costly to the child, and therefore represents an altruistic act. Children without siblings were found to be 28% more likely to share than children with siblings, while lastborns were found to be 17% less willing to share than children with younger siblings once age is controlled for. Both of these findings are in contrast to the literature discussed above, potentially due to the use of a behavioural rather than a questionnaire measure. The authors suggest that children with siblings experience more competition for resources, making them less willing to share. Lastborns, due to their small size, are less able to resolve the competition in their own favour, leading them to seize resources whenever the opportunity arises and therefore keep both sweets in the sharing game. In their view, singletons are the most generous as they do not experience these conflicts, nor do they have siblings as natural playmates leading them to use generosity as a strategy to make friends.

Fehr et al. (2008) comment that their findings are in opposition to those of Sulloway (1996), who found laterborns to be more Agreeable than firstborns, and suggest that this may be due to the differences between questionnaire measures used by Sulloway and their own use of a behavioural measure. However, there are additional factors that may have influenced Fehr et al.'s findings. Sibling status was assessed by questionnaire once the study had been completed and was therefore not counterbalanced. Furthermore, there is no mention of potential order effects or counterbalancing of the three games (i.e. the sharing treatment and the two additional treatments). Receiving the ultimatum game before the DG has been found to lower children's DG donations (Harbaugh et al., 2003) and

it is possible that behaviour may have differed in the sharing treatment depending upon whether it was received before, after or between the other two treatments. This is especially likely as the child was giving to the same person each time and may have felt that they no longer needed to share if they had already done so earlier in the study. Given the lack of sibling counterbalancing, it is possible that an imbalance in the treatment order may have influenced results across sibling status and age groups. Thus Fehr et al.'s findings need to be replicated with properly balanced groups of siblings. The ideal task to use would be the DG, as it provides a measure of altruism that is suitable for use with young children, which allows a behavioural response and yet permits a wider range of response options than Fehr et al.'s forced choice. However, no study to date has implemented the DG for examination of the influence of siblings upon altruistic behaviour in children. Use of this task would enable the determination of whether Fehr et al.'s unexpected results are a factor of their use of a behavioural measure rather than a questionnaire, or whether they can instead be attributed to other factors such as counterbalancing inconsistencies.

2.1.2 The dictator game as a measure of altruism in children

Due its simplicity, the DG has recently been used with children, often with different endowments used for different ages. Stickers have been used with preschoolers and young children (e.g. Benenson et al., 2007; Gummerum et al., 2010; Lucas et al., 2008); points that can be exchanged for goods or money have been used in middle childhood and adolescence (e.g. Harbaugh & Krause, 2000; Harbaugh et al., 2003), as has real money (e.g. Gummerum et al., 2008). Results with children are more variable than those with adults, with mean donations ranging from 12% in a group of 7-18 year-olds and increasing by 2% with each additional year of age (Harbaugh et al., 2003), to a mean donation of 43% in a group of 5 year-olds (Gummerum et al., 2010). However, this variability may be at least in part attributable to variability in methodology, not just in the choice of endowment to be

divided, but also how the endowment should be divided, how the decision to divide is made and how many iterations of the DG the child takes part in. For instance, unlike most other studies Lucas et al. (2008) did not give children the option to keep the whole endowment; Gummerum et al. (2008) asked children to make the decision in groups of three, while in most other studies each child takes part individually; and while many studies are one-shot, Harbaugh and Krause (2000) asked children to divide 11 different amounts, while Harbaugh et al. (2003) asked children to take part in an ultimatum game either before or after the DG. However, despite this heterogeneity in methodology and results, use of the DG with children has demonstrated that they are not consistently selfish and even children as young as 3 years are frequently altruistic in their behaviour (Gummerum et al., 2010).

2.1.3 Mechanisms of sibling influence

It remains unclear how siblings exert their influence on their co-siblings. In the realm of prosocial and altruistic behaviour, siblings may affect a child's altruistic development by shaping their acquisition of those personal norms related to altruism. Social norms, i.e. behavioural expectations within a group that are enforced by external sanctions (Fehr & Fischbacher, 2004), play an important role in altruistic behaviour (Allison, 1992; Bowles & Gintis, 1998; Gintis, 2003b). Adherence to social norms such as cooperation is so important that unaffected third parties are willing to bear a personal cost to punish people that have violated a norm, a process termed altruistic punishment (Boyd, Gintis, Bowles, & Richerson, 2003; de Quervain et al., 2004; Fehr & Gächter, 2002). Personal norms are social norms that have been internalised so that the threat of external sanctions is not necessary – the individual faces internal sanctions should violation of the norm occur (Schwartz & Howard, 1980) and will adhere to the norm even in the absence of external observation (Perugini et al., 2003). Given that the process of internalisation occurs through socialisation throughout childhood (Gintis, 2003a; Thøgersen, 2002), it seems likely that possessing siblings may

influence the rate at which social norms become personal norms. Cialdini et al. (1981) suggest that the norm of altruism is internalised by late childhood/early adulthood; however, recently children as young as three years have been shown to be aware of the existence of social norms and that they should not be violated (Ingram & Bering, 2010; Rakoczy, Warneken, & Tomasello, 2008). Internalisation of the altruistic norm may therefore occur considerably earlier than Cialdini et al. (1981) predicted, lending plausibility to the idea that interactions with siblings, which make up a large proportion of all social interaction in early childhood, may facilitate this process.

There are a number of mechanisms that have been suggested to drive the influence of siblings upon their co-siblings' development (see Table 2.1). Confluence theory (Zajonc & Markus, 1975) and the resource dilution hypothesis (Downey, 2001) will not be considered here as they pertain to cognitive outcomes, which as discussed above show an opposing pattern to personality and social outcomes. The remaining mechanisms can be broadly divided into two classes, divergent and convergent: divergent mechanisms lead the child to behave differently than their siblings while convergent mechanisms lead to increasing similarity amongst co-siblings. Sulloway (2001; 2007) summarises the following five divergent mechanisms in his family dynamics model: differences in parental investment, birth-order stereotypes, dominance hierarchy effects, niche partitioning and deidentification. *Differences in parental investment*, in a similar vein to resource dilution, lead to children's outcomes declining as the number of siblings increases and parental investment is divided accordingly; middleborns in particular are expected to suffer as they do not experience a period of undiluted parental investment as do firstborns and lastborns. Herrera, Zajonc, Wieczorkowska and Cichomski (2003) found that people have differential expectations based on birth order and these are reflected in the choice of occupation a person will make. They suggest that this choice may be influenced by *birth order*

stereotypes, with parents' expectations based on birth order influencing their treatment of a child and ultimately reinforcing the stereotype. Of course, it remains possible that these stereotypes are not the cause of sibling differences, but in fact are a product of them. Both stereotypes and parental investment are indirect influences, i.e., the sibling influences the behaviour of others, who in turn influence the development of the child. The remaining influences are direct, with the sibling personally influencing the child's development. *Dominance hierarchy effects* are the result of older siblings having greater size and power, which Sulloway suggests causes laterborns to compensate through being more agreeable and open to experience. *Niche partitioning* is a process posited by Sulloway in which children seek their own niche within the family in a manner comparable to the evolutionary process of an organism finding a niche within an ecosystem. Laterborn children seek to distinguish themselves from their adjacent siblings by finding different domains in which to excel, essentially adjusting their personality in order to diversify. Similarly, *deidentification* leads children to distinguish themselves from their immediately adjacent sibling in order to reduce rivalry (Schachter, Shore, Feldman-Rotman, Marquis, & Campbell, 1976).

Given that adhering to a social norm involves conformity rather than dissociation it seems unlikely that the divergent mechanisms described above are responsible for the internalisation of altruistic norms. Downey and Condron (2004) propose that siblings are resources, with children developing interpersonal skills through interaction with their siblings, which can then be more widely applied. Brody (2004) suggests that siblings can directly influence their co-siblings through *teaching* and acting as *behavioural models*, i.e., convergent mechanisms in which an increase in sibling similarity can be expected. It is not unusual for older siblings to be given caregiving responsibility of their younger siblings, during which time they use their greater knowledge and experience to take on the role of teacher (Brody, Stoneman, Mackinnon, & Mackinnon, 1985). In addition, it is widely

accepted that children often adopt their siblings as behavioural models and copy them accordingly (Whiteman & Christiansen, 2008). Both teaching and modelling seem plausible candidates for a potential sibling influence on altruistic behaviour: children may conform to the altruistic norm by implicitly copying or being explicitly taught by their siblings. If this is the case, lastborns would be likely to internalise the norm the earliest as they would have teaching/modelling input as soon as they are able to interact with their siblings, while firstborns of the same age would have spent some time without siblings and still more with infants who will provide poor input. Singletons would internalise the norm the latest as they have no experience with siblings and would be relying on interactions with parents and peers.

While there are clearly a number of potential mechanisms driving siblings' influence on their co-siblings, there is surprisingly little direct examination of the extent to which they are implemented and in which situations each mechanism is employed. Whiteman and colleagues are one of the few research groups to directly assess the means by which siblings exert their influence. Whiteman, McHale and Crouter (2007a; 2007b) assessed the degree to which adolescent younger siblings feel they model or deidentify from their older siblings. As might be expected, they found that different children adopted different strategies, some modelling, some deidentifying, some doing both and still others doing neither. Later work by Whiteman and Christiansen (2008) revealed that in two-child families firstborns both model and deidentify from secondborns and vice versa; that is, younger siblings have an impact on their older siblings as well as older siblings affecting the younger child. These studies demonstrate the complexity of the sibling relationship; however, they were conducted with adolescents and the mechanisms at work in young children's sibling relationships remain unexplored.

The studies described above focus on the child's position within the sibling constellation and the effect that this has on a child's development. However, this influence will be modulated by the quality of the relationship between a child and her sibling, affecting the mechanism by which a sibling exerts her influence. Deidentification may be the result when the sibling relationship is fraught with conflict and hostility, but when the relationship is more positive then siblings' behaviour will be more likely to converge. However, the sibling relationship is often characterised by a mixture of positive and negative feelings, which are often rather intense (Dunn, 2006). Nonetheless, Dunn & Munn (1986) found that 2 year-olds whose older siblings had previously been cooperative were more likely to be cooperative themselves six months later, creating a virtuous circle of cooperation. Clearly the mere presence of siblings in the home is not sufficient to increase prosociality, but a positive relationship with the siblings is also necessary.

2.1.4 Confounding variables on altruism in the DG

As discussed above, sibling status is a variable that may influence altruistic behaviour, including performance on the DG, but with the exception of Fehr et al.'s (2008) study this has yet to be assessed with a behavioural measure in children. There are also a number of variables which may influence DG behaviour in addition to sibling status and may moderate or drive any observed sibling effect. Possessing siblings has often been found to influence cognitive ability, including mathematical ability. At 4 years old there is likely to be some variability in children's understanding of the numerosities involved in the DG, typically conducted with an endowment of ten items, some of which may be attributable to sibling status. However, the less cognitively demanding strategy of subitizing, the ability to rapidly appraise numerosity without directly counting, has a limit of four items, far lower than the typical endowment size (Benoit, Lehalle, & Jouen, 2004; Starkey & Cooper, 1995; Wynn, 1990). Should difficulty in mathematical ability create inconsistencies in young children's

Table 2.1: Predictions of 4-5 year-olds' altruistic behaviour in the DG based upon mechanisms of sibling influence

Mechanism	Prediction of differences in amount donated in the DG by 4-5 year-old children across sibling groups	Explanation
Differences in parental investment	Singletons > firstborns > lastborns	As more siblings are born, parental investment is reduced and outcome declines.
Birth-order stereotypes	(Firstborns = lastborns) > singletons	Singletons are often stereotyped as being selfish (see Mancillas, 2006); stereotypes with regard to firstborns' and lastborns' generosity have not been described therefore it is likely that there is no difference.
Dominance hierarchy effects	Lastborns > singletons > firstborns	Lastborns, having less power, use agreeableness and generosity to compensate; singletons, whose only experience of a power imbalance is with their parents, are expected to lie between firstborns and lastborns.
Niche partitioning	(Singletons = firstborns) < lastborns	Firstborns are akin to singletons as they are essentially singletons until a sibling is born; laterborn siblings seek to distinguish themselves by increasing their agreeableness and generosity.
Deidentification	Firstborns ≠ lastborns No prediction for singletons	Siblings reduce rivalry by diverging from their adjacent siblings. No prediction of direction can be made from this mechanism alone, simply that siblings will differ, therefore no prediction can be made with regard to singletons. Outcome is likely to be modulated by the number of siblings as the child deidentifies from their immediately adjacent sibling.
Teaching	Lastborns > firstborns > singletons OR (Lastborns = firstborns) > singletons	Firstborns pass on behavioural norms that they themselves have internalised. Lastborns may therefore internalise these norms at an earlier age than firstborns. Singletons are less likely to have internalised these norms at this age due to their lack of experience with siblings.
Behavioural modelling	Lastborns > firstborns > singletons OR (Lastborns = firstborns) > singletons	Lastborns copy firstborns' behaviour. Once again, lastborns may show this behaviour at an earlier age. Singletons are less likely to show the behaviour at this age due to their lack of experience with siblings.

DG performance one would expect that reducing the endowment size to within the limit of subitizing, thus bypassing the necessity to understand the numerosities involved, should reduce this variability and allow children's true intentions to be observed in their behaviour. Should mathematical ability not have an influence on altruistic behaviour in the DG, reducing the endowment size should not have an influence as allocations have been shown in both children (Harbaugh & Krause, 2000) and adults (Carpenter et al., 2005; Forsythe et al., 1994; List & Cherry, 2008) to be independent of endowment size, even when endowment size is increased tenfold (Carpenter et al., 2005).

Gender may also influence DG behaviour, although findings to date are mixed with many studies finding no effect of gender in both adults (Bolton & Katok, 1995) and children (Benenson et al., 2007; Lucas et al., 2008). However, of those studies that find a significant effect of gender, females are consistently found to donate more of their endowment than males in both adults (Eckel & Grossman, 1998; Kamas et al., 2008) and children (Gummerum et al., 2010; Gummerum et al., 2008; Harbaugh et al., 2003). This difference has been attributed to females being more likely to be socialised to be prosocial (Robert B. Cialdini et al., 1981) and being more sensitive to social cues (Croson & Gneezy, 2009).

Social factors such as SES, ToM ability and time spent with genetically unrelated peers may also influence DG behaviour and any sibling effect. As discussed above, SES is often confounded with sibling status and while SES has not been shown to influence 4-year-olds' DG behaviour, donations have been found to increase with SES in older children (Benenson et al., 2007). Performance on a DG-like task⁴ has been shown to differ according to role-taking ability (the ability to take on another's viewpoint, comparable to ToM): children with

⁴ In Froming et al.'s (1985) study children were given 25 M&M sweets for their participation and offered the opportunity to give some to a child from their school that was unable to take part. Those that they gave away were placed into a container in the centre of the table which already contained 10 sweets, implying to the child that others had already donated.

high role-taking ability gave less than those with low ability, possibly because they have a better understanding of the implications of the anonymity of the situation (Froming et al., 1985). Given that ToM ability is boosted by the possession of siblings this suggests the possibility that this variable may also provide a confounding influence on any potential sibling effect. This seems unlikely to be the case as no previous relationship has been observed between ToM ability and actual DG behaviour in typically-developing children (Lucas et al., 2008; Sally & Hill, 2005), although Sally and Hill found, consistent with Froming et al. (1985), that children on the autistic spectrum gave less in the DG as their first-order false belief performance improved. As such, it is worth confirming that a confound is not present. Similarly, any observed sibling effect may in fact be due to time spent with peers. Interactions with peers provide important socialisation experience, including sharing resources (Hay et al., 1999). While time spent with peers has previously been demonstrated not to influence sharing behaviour (Fehr et al., 2008; Hunting, 1991), the influence of peers on altruism in the DG is yet to be examined and it is possible that it is socialisation in general rather than siblings in particular that is important for internalising altruistic norms.

2.1.5 Present study

The present study aimed to identify the influence of sibling status on altruistic behaviour in the DG in 4-5 year-old children, independently of the confounding variables discussed above. There is a great deal of inconsistency in the sibling literature of how to partition children into groups. Some studies compare children with and without siblings, while others are concerned only with children that possess siblings and compare firstborns to laterborns (i.e. middle and lastborns) or lastborns to earlyborns (i.e. firstborns and middleborns). The present study focussed on comparing singletons (children with no siblings) to firstborns and lastborns, allowing examination of both birth order and possession of siblings as influences upon DG behaviour. As the present study was rigorous in its delineation of sibling status,

twins and middleborns were not included as they could not be satisfactorily grouped in any of these categories.

While no previous study has directly assessed the relationship between siblings and the classic DG, results of studies across the personality, social and prosocial literature suggests that possession of siblings will lead to an increase in donations on the DG. This research making use of adult questionnaire evidence consistently shows that being lastborn (i.e. possessing only older siblings) will be more beneficial to altruistic behaviour than being firstborn (i.e. possessing only younger siblings). However, the only behavioural measure in children to date (Fehr et al., 2008) has shown the opposite pattern, with lastborns being less generous than firstborns and singletons the most generous of all. If the methodology with which altruism is assessed, whether questionnaire-based or behavioural, influences the sibling effect then results with the DG would be expected to mirror those of Fehr et al. due to the DG also being a behavioural measure. However, should Fehr et al.'s findings be anomalous due to the sampling and methodological issues discussed above, findings with the DG would be expected to fall in with the remaining literature.

In order to ensure that the standard form of the DG is appropriate for use with young children, two iterations of the DG were conducted: one with the standard endowment of 10 items and another with a reduced endowment of 4 items. A measure of the mathematical abilities that are likely to be used in the DG, the ability to divide equally and discriminate less and more, was also taken to ensure that mathematical ability is not influencing any sibling differences or the general performance on the DG. Gender was counterbalanced across sibling groups in order to ensure that potential gender differences do not drive any sibling differences. In addition, as many authors have found sibling status to be confounded with SES, a measure of this variable was also taken to ensure that any

sibling differences found cannot be attributed to differences in SES. Similarly, ToM ability (as measured by first-order false belief) was assessed as it has often been found to be related to sibling status. Finally, in order to ascertain whether any observed effects are peculiar to siblings or as a result of increased socialisation in general, a measure of time spent with peers was also taken.

2.2 Methods

2.2.1 Participants

One hundred and twelve 4-5 year-old children (mean age 4:11; age range 4:0 to 5:11) participated in the study. Thirty children were recruited from the Human Development and Learning database and were tested in the School of Psychology, University of Nottingham. The remaining 82 children were recruited from local Nottingham schools and were tested in a quiet environment in their school setting. At the time of consent, parents completed a questionnaire detailing demographic information such as home postcode, the number and ages of each child's siblings along with average time spent with peers per week (see Appendix 1). SES was calculated by entering the child's postcode into the Office of National Statistics database, which creates an Index of Total Deprivation based on the area's level of income, employment, health, education, housing and services, crime and living environment ("Office for National Statistics," 2007); these values were subsequently converted into percentiles where a higher percentile represents higher SES.

Table 2.2: Descriptive statistics across sibling groups (standard deviations in parentheses; ranges in italics)

	Singletons	Firstborns	Lastborns	Group differences
Total n	22	50	40	
Gender (female:male)	11:11	25:25	20:20	
Age/months (mean)	59.09 (7.43) <i>49.00-72.00</i>	59.90 (5.60) <i>49.00-70.00</i>	58.15 (5.71) <i>48.00-70.00</i>	$H(2)=2.18, p=.34$
Time spent with unrelated peers (mean hours/week)	30.65 (11.25) <i>9.00-45.00</i>	30.89 (8.63) <i>3.00-42.25</i>	29.94 (9.94) <i>10.00-45.75</i>	$H(2)=0.30, p=.86$
SES (mean percentile)	64.31 (20.86) <i>12.09-99.53</i>	81.88 (23.99) <i>12.09-99.53</i>	72.82 (27.54) <i>12.09-99.53</i>	$H(2)=11.77, p<.01$; singletons < firstborns ($U=272.00, p<.001$)

Children were recruited on the basis of sibling status to fall into the following groups: singletons (no siblings), firstborns (only have younger siblings) and lastborns (only have older siblings). Each group contained equal numbers of males and females (see Table 2.2 for details).

2.2.2 Procedure

Each child participated in two iterations of the DG: one standard version with 10 stickers (hereafter *10 condition*) and one with a reduced endowment of 4 stickers (hereafter *4 condition*). The order in which conditions were received was fully counterbalanced across gender and sibling status. Each child subsequently completed two measures of the mathematical abilities involved in the DG, followed by two first-order false belief measures of ToM (see Appendix 2 for full instructions).

2.2.2.1 *DG*

The child was presented with a selection of stickers and asked to choose her favourite sticker. This sticker was removed from the selection and placed upon a felt array with either 4 or 10 slots, depending upon the condition (see Figure 2.1 for an illustration of the arrays); the order in which the conditions were received was fully counterbalanced. The child was then asked to choose her favourite from the remaining stickers until all slots on the array were filled. In total, each child chose 14 stickers: 10 stickers from a selection of 30 in the 10 condition and 4 stickers from a selection of 12 in the 4 condition (the ratio in keeping with the 10 condition). Stickers in the 4 condition were larger than those in the 10 condition in an attempt to keep the total value of each sticker selection comparable (assuming that larger stickers are more valuable to children). As sticker size varied slightly in the 10 condition, all stickers were backed onto white felt in order to keep area subtended constant – 4cm^2 in the 10 condition and 9cm^2 in the 4 condition; this also served

to make numerosity discrimination more straightforward (as subitizing may be performed on the basis of area; Feigenson, Carey & Hauser, 2002).

Once the child had made her selection, the remaining stickers were removed from sight. The child was informed that the stickers were hers to keep, but if she wished she could give some of her stickers to another child that had none. The participant was given no other information about the other child and it was emphasised that she was not obliged to give away any stickers at all and that her choice would be completely anonymous. In order to achieve this, the experimenter presented the child with two envelopes, one for the participant and one for the other child. The participant's name was written on her envelope and she was asked to divide the stickers between the envelopes as she saw fit. To maintain anonymity, the experimenter and any parents present covered their eyes during this division. The arrays allowed the child to make a visual comparison between those stickers that she had removed to donate (resulting in an empty slot) and those that remained in an effort to ensure that the children were aware of the proportions involved.

In order that no child felt obliged to donate through guilt avoidance, the child was shown that each envelope contained a colouring picture so that no-one would receive an empty envelope. Once the child had made her division, the stickers were sealed into the envelopes and the envelope for the other child was posted into a red postbox. The child was then shown the selection of stickers for the next condition and the process was repeated. Once the study was complete the experimenter opened the envelopes and recorded the contents before the stickers were returned to a pool to be distributed amongst future participants.

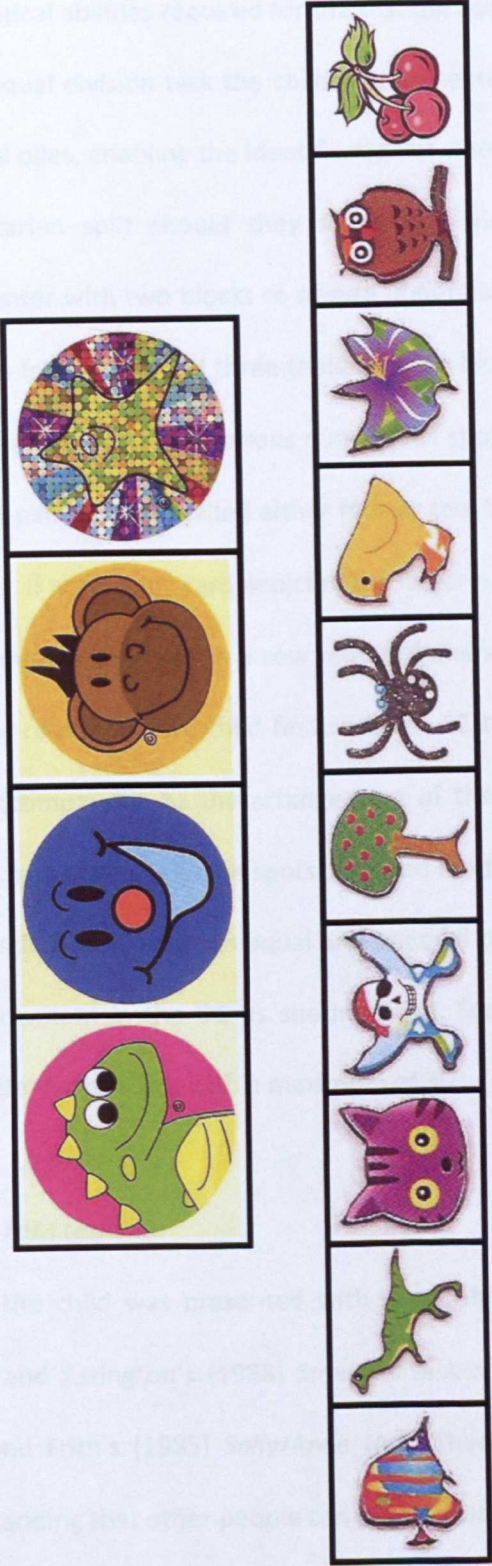


Figure 2.1: Illustration of stickers and array (actual size) in the 4 condition (top) and 10 condition (bottom)

2.2.2.2 Mathematical ability

Following the two versions of the DG, the child was given two tasks intended to reflect the mathematical abilities required for the DG: the *equal division task* and the *same/more task*. For the equal division task the child was presented with blocks and asked to divide them into equal piles, enabling the identification of whether the children were capable of making an egalitarian split should they so desire. The task was first demonstrated by the experimenter with two blocks to ensure understanding and then the child was given three trials with four blocks and three trials with ten blocks. In the same/more task the child was shown pairs of cards with various numbers of spots in the following ratios: 2:2, 1:3, 5:5 and 8:2; each pair always totalled either four or ten. She was asked whether each pair was the same and, if not, which card depicted the larger numerosity. Pairs were pseudorandomised, with no more than three in a row requiring the same answer to avoid perseveration upon the same response. The child first received 12 trials with the spots presented in a linear fashion (comparable to the arrangement of the stickers in the DG) followed by a more challenging 12 trials with the spots arranged randomly. This task revealed whether the child could discriminate between equal and unequal divisions – if not she may not have divided her endowment in the DG as she intended. Scores were summed across tasks to give a composite maths score with a maximum of 30.

2.2.2.3 ToM tasks

Finally, the child was presented with two ToM tasks: the *deceptive box task*, based on Gopnik and Astington's (1988) Smarties task and a pictorial adaptation of Baron-Cohen, Leslie and Frith's (1985) *Sally/Anne task*. These tasks assess first-order false belief: the understanding that other people can possess different beliefs than the child.

The deceptive box task assesses a child's ability to predict that a person in possession of different information than the child will think differently than the child would. The child was shown a chocolate biscuit box and asked what she thought was inside. When she answered 'chocolate' or 'biscuits' the box was opened and the unexpected content of a banana was revealed. The child was asked what was inside the box and when she replied 'a banana' the banana was returned to the box, which was then closed up. The child was then asked the test question: what an absent parent would think was inside the box should they see it closed as it was. If the child replied 'chocolate' or 'biscuits' she was categorised as passing the test question, if she replied 'a banana' she was classed as failing the test question. In order to confirm that the child fully understood the task, she was then asked two control questions: what it looks like the box contains (the correct answer being 'chocolates' or 'biscuits') and what was really inside the box (the correct answer being 'a banana'). If the child failed to answer either of the control questions correctly it was impossible to interpret her answer to the test question as a true pass or fail as she may not have fully understood the question. As such, her response was classed as uninterpretable and for the purposes of analysis coded as a fail.

The Sally/Anne task is less challenging for children than the deceptive box task as the child's own perspective is less salient. The child was shown an illustrated story in which one character, Sally, puts her ball into her basket and leaves the room, after which the other character, Anne, moves the ball into her box without Sally's knowledge. Sally then returns and the child is asked the test question of where Sally will look first to find her ball. The response 'in the basket' requires the child to understand that Sally does not possess the same information as the child and is classed as a pass; the response 'in the box' is therefore a fail. The child is then asked two control questions to assess her memory and understanding of the story: where the ball was at the beginning of the story and where the

ball actually was at the end of the story (the correct answers being 'in the basket' and 'in the box', respectively). Failure to answer either of these questions correctly led to the child's response on the test question being categorised as uninterpretable and for the purposes of analysis was coded as a fail.

Scores on the two tasks were summed into a composite ToM score as follows: all those children whose responses were uninterpretable scored zero for that task on the composite score, so only those children who passed one or both of the tasks could score above zero on the composite score. Passing both tasks gave a composite score of two, passing either the deceptive box or the Sally/Anne gave a composite score of one and passing neither gave a composite score of zero.

2.3 Results

Data were examined for skewness and kurtosis. As data were not normally distributed, non-parametric statistics were employed. An alpha level of .05 was used for all statistical tests. In order to be conservative in the analyses, all tests were two-tailed.

2.3.1 Mathematical ability

The relationship between scores on the equal division task and same/more task was examined, revealing that there was only a small, nonsignificant correlation between the tasks ($r_s=.13$, $p=.19$). Data were then compared across sibling groups for the composite maths score, the equal division task and the same/more task (see Table 2.4). There was an effect of sibling status approaching significance on the composite maths score ($H(2)=5.75$, $p=.06$). Sibling groups did not significantly differ on the equal division task ($H(2)=0.23$, $p=.89$) but there was a significant difference on the same/more task according to sibling status ($H(2)=8.22$, $p=.02$). Post-hoc Mann-Whitney tests revealed that both singletons and lastborns scored significantly lower than firstborns ($U=344.50$, $p=.01$; $U=689.00$, $p=.03$, respectively), while there was no significant difference between singletons and lastborns ($U=367.50$, $p=.52$).

2.3.2 ToM ability

Performance on the deceptive box task and the Sally/Anne task was found to be consistent for 57.14% of children (see Table 2.3). When performance was inconsistent, children were more likely to pass the Sally-Anne task (77.08%) than the deceptive box task (22.92%; McNemar χ^2 $p<.001$) Data were then compared across sibling groups for the composite ToM score, the deceptive box task and the Sally/Anne task (see Table 2.4). There was no effect of sibling status for the composite score or the deceptive box task ($H(2)=0.52$, $p=.77$; $\chi^2(2)=0.07$, $p=.97$, respectively); however, there was a significant effect of sibling status on

the Sally/Anne task ($\chi^2(2)=6.36$, $p=.04$), with singletons passing the task less often than firstborns ($z=2.51$, $p=.01$). There were no differences between singletons and lastborns ($z=1.41$, $p=.16$) or firstborns and lastborns ($z=1.26$, $p=.21$).

Table 2.3: Consistency table showing the number of children in the group as a whole passing and failing the two ToM tasks

	Fail Sally-Anne	Pass Sally-Anne
Fail Deceptive box	31	37
Pass Deceptive box	11	33

Table 2.4: Maths and ToM ability across sibling groups (standard deviations in parentheses; ranges in italics)

		Singletons	Firstborns	Lastborns	Group differences
Maths tasks	Equal division task (mean score/6)	5.55 (0.91) <i>3-6</i>	5.64 (0.80) <i>3-6</i>	5.45 (1.18) <i>1-6</i>	$H(2)=0.23$, $p=.89$
	Same/more task (mean score/24)	22.64 (1.22) <i>21-24</i>	23.33 (1.18) <i>19-24</i>	22.65 (1.74) <i>17-24</i>	$H(2)=8.22$, $p=.02$; singletons < firstborns ($U=344.50$, $p=.01$), lastborns < firstborns ($U=689.00$, $p=.03$)
	Composite maths (mean score/30)	28.18 (1.65) <i>24-23</i>	29.00 (1.43) <i>24-30</i>	28.32 (2.14) <i>20-30</i>	$H(2)=5.75$, $p=.06$
ToM tasks	Deceptive box task (pass rate)	.64 (.49)	.68 (.47)	.55 (.50)	$\chi^2(2)=0.07$, $p=.97$
	Sally/Anne task (pass rate)	.41 (.50)	.68 (.47)	.55 (.50)	$\chi^2(2)=6.36$, $p=.04$; singletons < firstborns ($z=2.51$, $p=.01$)
	Composite ToM score (mean score/2)	1.05 (0.72) <i>0-2</i>	1.06 (0.82) <i>0-2</i>	0.95 (0.71) <i>0-2</i>	$H(2)=0.52$, $p=.77$

2.3.3 Prosocial behaviour

Data were first examined in terms of the *overall donation profile* (i.e. the proportion of their stickers donated by each child). This was then broken down into analyses of the *decision to donate* (i.e. donating nothing or donating one or more stickers) and the proportion of stickers donated by only those who chose to donate (hereafter *positive donations*). See Table 2.5 for mean donations in each condition; Figure 2.2 shows the distributions of donations in each condition. The modal offer was zero in both conditions; when only positive donations are taken into account the modal offer was two stickers (50%) in the 4 condition and four stickers (40%) in the 10 condition.

Table 2.5: Mean proportion of endowment donated in the 4 condition and the 10 condition (standard deviations in parentheses)

	4 condition	10 condition
Overall donation	17.41 (21.45)	14.91 (19.77)
Decision to donate: proportion choosing to donate	43.75	41.96
Positive donations	39.80 (12.41)	35.53 (13.96)

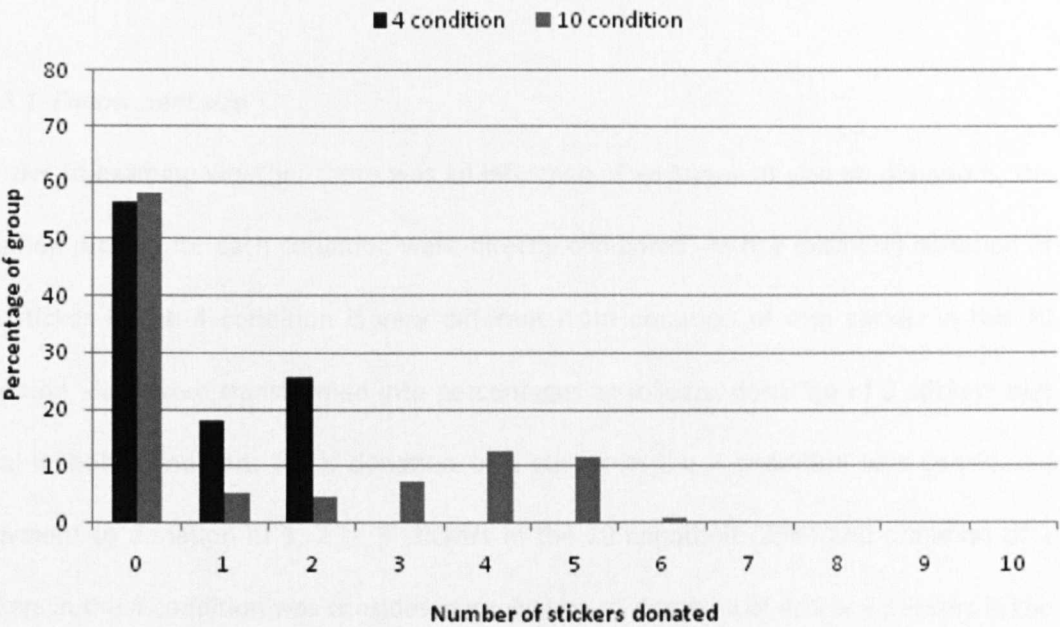


Figure 2.2: Donation distributions in the 4 condition and the 10 condition

Analyses were initially conducted to establish whether there were differences in donation profiles dependent upon the *order in which the conditions were received*. There were no significant differences in donations in the 4 condition in terms of overall donation profile ($U=1461.50$, $p=.49$), decision to donate ($\chi^2(1)=0.04$, $p=1$) or positive donations ($U=221.50$, $p=.09$); this was also the case for the 10 condition ($U=1456.00$, $p=.47$; $\chi^2(1)=0.33$, $p=.70$; $U=247.00$, $p=.55$ respectively). As such, all subsequent analyses were performed on data collapsed across the order in which the conditions were received.

Data were subsequently analysed to assess the impact of children's *sticker preferences* upon their donation behaviour. As children chose the stickers in order of preference, the first 50% chosen were coded as most preferred and the final 50% were coded as least preferred. The proportion of stickers donated that were most and least preferred were calculated and Wilcoxon analyses revealed that in the 4 condition children donated significantly more of their least preferred stickers ($z=-2.20$, $p=.04$) while there was no difference in proportion of stickers donated according to preference in the 10 condition ($z=-1.21$, $p=.23$).

2.3.3.1 Endowment size

In order to examine whether there was an influence of endowment size on donations, the donation profiles for each condition were directly compared. As (for example) donation of one sticker in the 4 condition is very different from donation of one sticker in the 10 condition, data were transformed into percentages as follows: donation of 0 stickers was equal in both conditions (0%); donation of 1 sticker in the 4 condition was considered equivalent to donation of 1, 2 or 3 stickers in the 10 condition (25%) and donation of 2 stickers in the 4 condition was considered equivalent to donation of 4, 5 or 6 stickers in the 10 condition (50%); no higher donations were made. See Figure 2.3 for transformed

distributions of donations in each condition. Wilcoxon analysis revealed no effect of endowment size on overall donations ($z=-1.69$, $p=.09$); a McNemar test using a binomial distribution showed no effect of endowment size on donation decision ($n=112$, $p=.81$) with 83.93% of children consistent in their donation decision; nor was there an impact of endowment size upon positive donations ($z=0$, $p=1$). Thus, children showed similar behavioural profiles across both iterations of the DG irrespective of the endowment size.

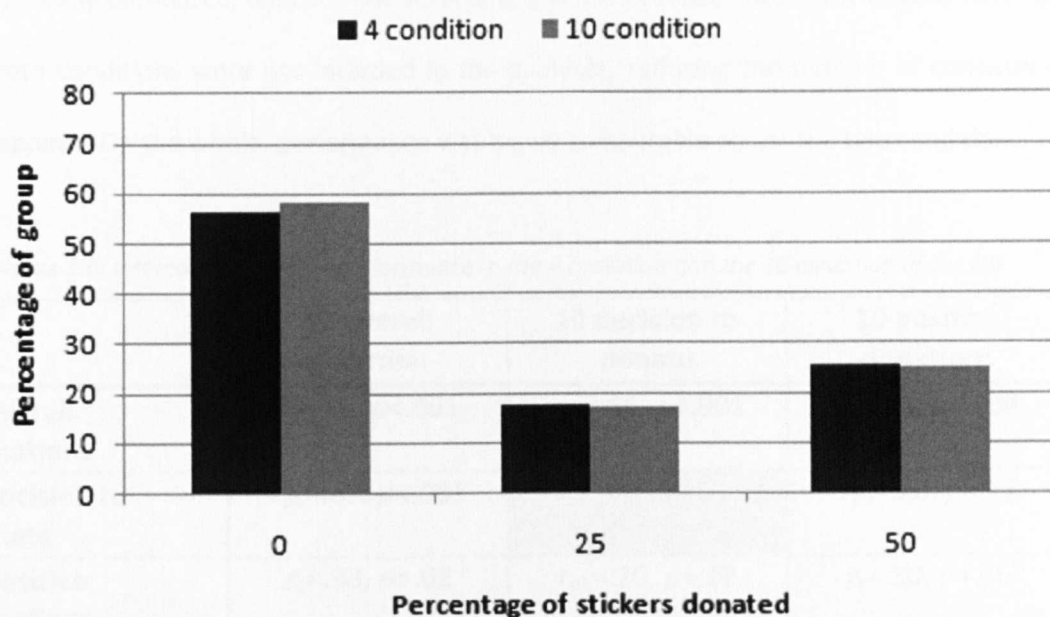


Figure 2.3: Donation distributions in the 4 condition and the 10 condition as transformed percentages of total endowment size

In order to confirm that performance was similar across endowment size, intercorrelations were conducted between performance on the 4 condition and the 10 condition (raw scores, not scaled scores, were entered). Table 2.6 shows that overall donations in the 4 condition were highly correlated with all measures of the 10 condition and overall donations in the 10 condition were significantly correlated with all measures in the 4 condition. There was a marginally significant correlation across endowment size for positive donations but the decision to donate and positive donations was not significantly correlated across endowment size.

The intercorrelations between donations for the two endowment sizes demonstrated that performance on both measures was highly related and can comfortably be assumed to be comparable. The correlation for positive donations just failed to reach significance, most probably because there is little variance in positive donations for the 4 condition, while a smaller number of children were included in the analysis as it was necessary for children to have donated in both conditions. The decision to donate and positive donations were not significantly correlated, which is not surprising given that those children who gave nothing in both conditions were not included in the analyses, reducing the number of consistent datapoints. On the whole, performance was highly comparable across the two conditions.

Table 2.6: Intercorrelations for performance in the 4 condition and the 10 condition of the DG.

	10 overall donation	10 decision to donate	10 positive donations
4 overall donations	$r_s=.70, p<.001$	$r_{pb}=.66, p<.001$	$r_s=.38, p=.008$
4 decision to donate	$r_{pb}=.67, p<.001$		$r_{pb}=.20, p=.17$
4 positive donations	$r_s=.33, p=.02$	$r_{pb}=.20, p=.17$	$r_s=.30, p=.06$

2.3.3.2 Gender

The impact of gender upon donations was assessed. In the 4 condition gender did not have a significant impact upon overall donation behaviour ($U=1535.00, p=.86$), the decision to donate ($\chi^2(1)=0.04, p=1$) or on positive donations ($U=295.00, p=1$). In the 10 condition gender did not have a significant effect upon overall donation behaviour ($U=1329.00, p=.12$), the decision to donate ($\chi^2(1)=4.44, p=.06$) or on positive donations ($U=192.00, p=.12$); however, there was a trend towards girls choosing to donate more often than boys.

The impact of sticker preference according to gender was also assessed. When directly comparing boys and girls, there was no effect of gender on the proportion of donations that were most liked or least liked in either the 4 condition ($U=227.50$, $p=.14$) or the 10 condition ($U=231.50$, $p=.26$). However, when comparing the proportion of most and least favourite stickers donated within subject for each gender individually, girls donations were composed of a significantly larger proportion of their least favourite stickers in the 4 condition ($z=-2.52$, $p=.02$) with no difference in the 10 condition ($z=-1.29$, $p=.21$); boys donations were not composed of significantly different proportions of most and least preferred stickers for either the 4 condition ($z=-0.50$, $p=.80$) or the 10 condition ($z=-0.32$, $p=.80$).

In sum, gender had little effect upon donations on the whole, with a trend for girls to choose to donate more often than boys in the 10 condition and girls, unlike boys, giving a larger proportion of their least preferred stickers in the 4 condition.

2.3.3.3 Sibling effect

Data were analysed to establish whether there were differences in donations according to sibling status. Kruskal-Wallis analysis revealed a significant effect of sibling status on the overall proportion of stickers donated in the 4 condition ($H(2)=8.67$, $p=.01$). Planned pairwise comparisons (using Mann-Whitney) showed no significant difference in proportion donated between singletons and firstborns ($U=535.00$, $p=.89$), but both singletons and firstborns donated significantly fewer stickers than lastborns ($U=316.00$, $p=.05$; $U=691.50$, $p=.01$, respectively). Sibling status did not have a significant effect on percentage of stickers donated in the 10 condition ($H(2)=2.33$, $p=.31$), although as Figure 2.4 shows, the trend was similar to that in the 4 condition.

Chi-square analyses revealed a significant effect of sibling status on the decision to donate in the 4 condition ($\chi^2(2)=6.71, p=.04$). Planned pairwise comparisons using two-sample Z-tests revealed no significant difference between the number of singletons and firstborns choosing to donate ($z=.19, p=.85$); there was a trend for singletons choosing to donate less often than lastborns ($z=1.78, p=.07$) while firstborns chose to donate significantly less often than lastborns ($z=2.46, p=.01$). No significant effect of sibling status was found on the decision to donate in the 10 condition ($\chi^2(2)=2.07, p=.38$) although once again Figure 2.5 reveals a similar trend to that of the 4 condition.

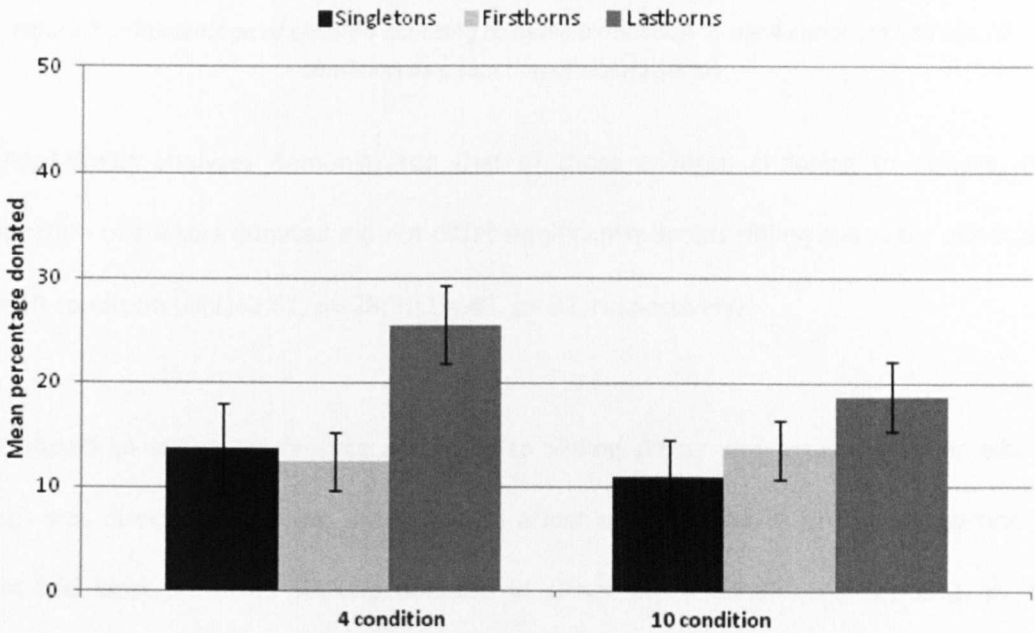


Figure 2.4: Percentage of endowment donated in the 4 condition and the 10 condition as a function of sibling status (error bars represent standard error of the mean)

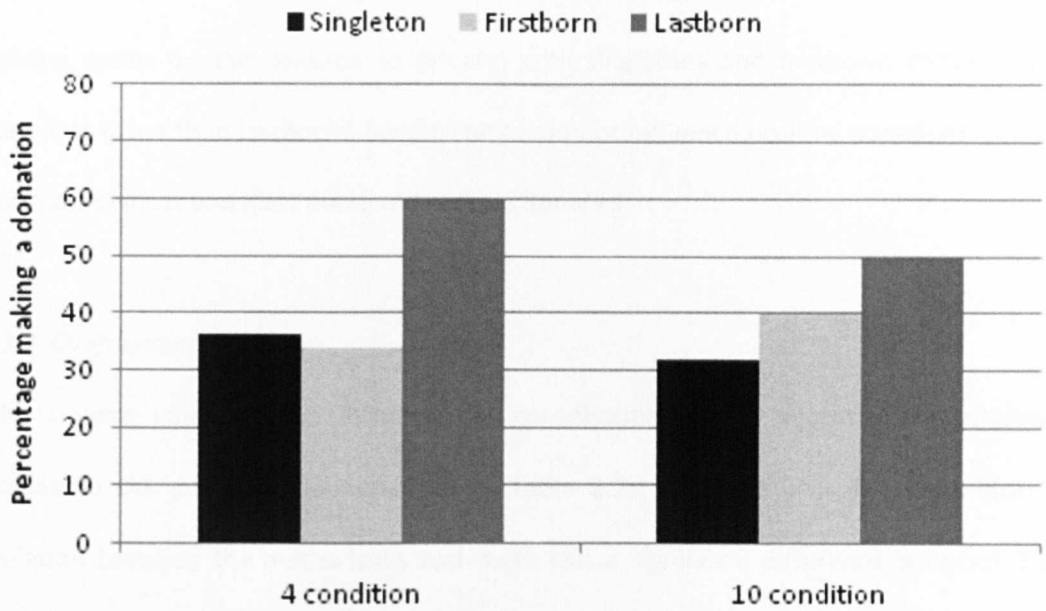


Figure 2.5: Percentage of children choosing to make a donation in the 4 condition and the 10 condition as a function of sibling status

Kruskal-Wallis analyses demonstrated that of those children choosing to donate, the proportion of stickers donated did not differ significantly across sibling status for either the 4 or 10 condition ($H(2)=2.61$, $p=.28$; $H(2)=.43$, $p=.92$, respectively).

The impact of sticker preference according to sibling status was assessed. When sibling status was directly compared, there was no effect of sibling status on the proportion of most and least preferred stickers donated in either the 4 condition ($H(2)=1.42$, $p=.49$; $H(2)=0.00$, $p=1$, respectively) or the 10 condition ($H(2)=0.76$, $p=.70$; $H(2)=1.28$, $p=.54$, respectively). When comparing within-subject for the individual sibling groups, there was no effect of favourites in either the 4 condition or the 10 condition for singletons ($z=-1.19$, $p=.34$; $z=0$, $p=1$, respectively), firstborns ($z=-1.75$, $p=.11$; $z=-0.85$, $p=.45$, respectively) or lastborns ($z=-1.07$, $p=.35$; $z=-1.64$, $p=.10$, respectively).

In sum, there was an effect of sibling status on the overall proportion of stickers donated in the 4 condition (and a similar but nonsignificant trend in the 10 condition), with both

singletons and firstborns donating fewer stickers than lastborns. This was due to an effect of sibling status on the decision to donate, with singletons and firstborns choosing to donate less often than lastborns. Sibling status did not influence positive donations or the proportion of most and least preferred stickers donated.

2.3.3.4 Confounding variables

Analyses were conducted to examine the contribution of the potential confounding variables to DG donations (summarised in Table 2.7). As there was not a significant correlation between the maths tasks and there was a significant difference between the frequency of passing the two ToM tasks, individual scores were entered into the correlations rather than composite scores. In the 4 condition, SES correlated negatively with both overall amount donated ($r_s = -.22$, $p = .02$) and the decision to donate ($r_{pb} = -.24$, $p = .01$), with children being less likely to donate and donations decreasing as SES increased. ToM correlated negatively with positive donations in both conditions, although this effect failed to reach significance in the 4 condition (4 condition: $r_s = -.27$, $p = .06$; 10 condition: $r_s = -.29$, $p = .05$). The variables above were subsequently entered into regression analyses along with possession of older siblings to determine whether the sibling effect remains when their effects are controlled for.

Table 2.7: Influence of potential confounding variables upon donations in the 4 condition and the 10 condition

Amount donated	4 condition	10 condition
Equal division task	$r_s = -.05, p = .61$	$r_s = -.08, p = .38$
Same/more task	$r_s = -.11, p = .24$	$r_s = .04, p = .72$
Time with peers	$r_s = -.11, p = .24$	$r_s = -.15, p = .11$
SES	$r_s = -.22, p = .02$	$r_s = -.03, p = .79$
Deceptive box task	$r_{pb} = -.06, p = .55$	$r_{pb} = -.14, p = .15$
Sally/Anne task	$r_{pb} = -.15, p = .13$	$r_{pb} = -.12, p = .22$
Decision to donate	4 condition	10 condition
Equal division task	$r_{pb} = -.04, p = .68$	$r_{pb} = -.11, p = .25$
Same/more task	$r_{pb} = -.09, p = .35$	$r_{pb} = .00, p = .99$
Time with peers	$r_{pb} = -.09, p = .35$	$r_{pb} = -.04, p = .65$
SES	$r_{pb} = -.24, p = .01$	$r_{pb} = -.07, p = .47$
Deceptive box task	$\chi^2(1) = 0.01, p = 1$	$\chi^2(1) = 3.39, p = .09$
Sally/Anne task	$\chi^2(1) = 1.07, p = .33$	$\chi^2(1) = 0.30, p = .69$
Positive donations	4 condition	10 condition
Equal division task	$r_s = -.09, p = .56$	$r_s = -.11, p = .46$
Same/more task	$r_s = -.16, p = .28$	$r_s = -.10, p = .51$
Time with peers	$r_s = .04, p = .78$	$r_s = -.20, p = .18$
SES	$r_s = .03, p = .84$	$r_s = .08, p = .62$
Deceptive box task	$r_{pb} = -.19, p = .18$	$r_{pb} = -.19, p = .20$
Sally/Anne task	$r_{pb} = -.22, p = .14$	$r_{pb} = -.24, p = .11$

As there were no differences in donations between singletons and firstborns, data were collapsed across these groups to create a new dichotomous variable: possession of older siblings. Simultaneous multiple regressions were conducted in order to establish whether the effect of possession of siblings on size of overall donations could be observed when additional variables were controlled. As such, possession of older siblings, gender and SES were entered as predictor variables (variables that produced a significant relationship with overall donations above were entered as predictors), with overall donations in the 4 condition as the dependent variable. Data were significantly skewed ($z\text{-score} = 2.77$) and kurtotic ($z\text{-score} = -2.98$) and so the results should be interpreted with caution. A significant model was produced ($F_{3,107} = 5.31, \Delta R^2 = .13, p = .002$) and possession of older siblings and SES

emerged as significant predictors: children with older siblings donated more, while donation size decreased as SES increased; coefficients are summarised in Table 2.8.

Table 2.8: Summary of multiple regression analysis for variables predicting overall donations in the 4 condition (n=111)

	B (SE)	Significance	95% CI for B
Constant	1.08 (0.27)	<.001	0.56-1.61
Possession of older siblings	0.49 (0.16)	.003	0.17-0.81
Gender	0.06 (0.15)	.71	0.36-0.25
SES	0.01 (0.003)	.02	0.01-0.001

A simultaneous multiple regression was also conducted with the predictor variables above and with overall donations in the 10 condition as the dependent variable. Data were significantly kurtotic (z-score=-2.89) and so the results should be interpreted with caution. The model failed to reach significance ($F_{2,109}=1.92$, $\Delta R^2=.03$, $p=.15$) and no variables emerged as a significant predictor of overall donations (coefficients are summarised in Table 2.9).

Table 2.9: Summary of multiple regression analysis for variables predicting overall donations in the 10 condition (n=112)

	B (SE)	Significance	95% CI for B
Constant	1.50 (0.30)	<.001	0.91-2.09
Possession of older siblings	0.60 (0.39)	.13	0.17-1.36
Gender	0.45 (0.37)	.23	1.18-0.29

Possession of older siblings, gender and SES were entered as predictor variables into a simultaneous logistic regression (predictors were derived from variables that produced a significant influence above on the decision to donate). The dependent variable was the

donation decision (i.e. donate something or donate nothing). In the 4 condition, the possession of older siblings and SES significantly predicted donation decision, with between 11% and 15% of the variance being accounted for by the model ($\chi^2(3)=13.44, p=.004$). Those who chose to donate had a lower SES and were more likely to have older siblings; coefficients, Wald statistics and exponentiated b are summarised in Table 2.10.

Table 2.10: Summary of logistic regression analysis for variables predicting donation decision in the 4 condition of the DG (n=111)

	B (SE)	Wald (df)	Significance	Exp b (95% CI)
Constant	1.81 (0.75)	5.97 (1)	.02	6.17
Possession of older siblings	-1.08 (0.42)	6.53 (1)	.01	0.34 (0.15-0.78)
Gender	0.18 (0.41)	0.20 (1)	.65	1.20 (0.54-2.68)
SES	-0.02 (0.01)	0.98 (1)	.02	6.17 (0.96-1.00)

In the 10 condition there were no significant relationships with donation decision, so a regression was not conducted on these data.

There were no significant relationships with positive donations in either the 4 condition or the 10 condition, so regressions were nt conducted on these data.

In sum, the strongest sibling effects were observed in the 4 condition and affected both the overall amount donated as well as the decision to donate. The result from the regression analyses confirmed that this sibling effect can be translated into an effect of possessing an older sibling, and that this effect was a significant predictor even when the effect of SES, a variable which significantly correlated with the donation profile, was partialled out.

2.4 Discussion

The current study sought to examine the influence of individual differences upon 4-5 year-olds' altruistic behaviour in the dictator game. It has demonstrated that even when steps are taken to reduce the cognitive demands of the task and when the least possible incentive is given for children to donate, almost half of children choose to make an altruistic donation in the dictator game. While this behaviour appears to be independent of mathematical understanding of the task, it is influenced by gender, sibling status, SES and ToM ability.

2.4.1 Overall altruistic behaviour

Behaviour was comparable whether the children were allocating an endowment of 4 stickers or 10 stickers: a mean of 18% (4 condition) or 15% (10 condition) of the total endowment was donated, with 44% (4 condition) or 42% (10 condition) of children choosing to donate at least one sticker. These findings are broadly consistent with previous studies in children of the same age, although there are a number of methodological differences that must be taken into account. Children in the current study donated less than those in Lucas et al.'s (2008) experiment, although this is only to be expected given that their children, unlike those in the current study, were not given the option to keep the entire endowment. However, when the mean donations of only those children who chose to donate (i.e. eliminating all of those who kept the entire endowment) are compared to the mean donation in Lucas et al.'s study, the results are very similar: in the current study, children who donated gave 40% in the 4 condition and 36% in the 10 condition, while Lucas et al. observed a mean donation of 40%. Interestingly, children in the present study were more likely to donate their less preferred stickers, suggesting that children are not acting at random but may be strategic in their altruistic behaviour, perhaps making a token gesture by donating less-preferred stickers.

Only one child (0.89% of total) in the present study chose to make a hyperfair allocation (i.e. donating more than 50% of the endowment, see Figure 2.2). Gummerum et al. (2010) found 12 children (15.58% of 3-5 year-olds) made hyperfair allocations, while for Lucas et al. (2008) 6 children (18% of 4-5 year-olds) made hyperfair allocations. This difference may be due to the child being allowed to choose individual stickers in the present study, while in both Gummerum et al. and Lucas et al.'s studies children were given 10 identical stickers, thus potentially reducing the value of each subsequent sticker and increasing the likelihood of donation. Adults, like the children in the present study, rarely make hyperfair offers (Camerer, 2003); as such it seems likely that allowing the child to choose different stickers provides a pie to divide that is more comparable to monetary endowments. Alternatively, it may be harder for the child to keep track of identical stickers, while in the present study, the use of different stickers along with the use of an array showing how many stickers have been removed and how many remain may have aided the children in their division and contributed to reduce the occurrence of hyperfair allocations.

The present study is most similar to that of Benenson et al. (2007), who also allowed the children to choose 10 different stickers and observed a mean donation of approximately 25% in their 4 year-olds. This mean is lower than those of Lucas et al. (2008) and Gummerum et al. (2010), but is higher than those of the present study. However, children in Benenson et al.'s study were aware that they were donating to children from their own classroom, while donations were completely anonymous in the present study. Giving to ingroup members is known to increase adults' DG allocations (Ben-Ner et al., 2009) and can cause a small increase in the allocations of children as young as 7 years even when group allocation is arbitrary (Gummerum, Takezawa, & Keller, 2009), and this may be responsible for the differences observed here. It must be borne in mind that the present study

attempted to give the children the least possible incentive to donate (donations were made to a stranger, the dictator was anonymous to both the recipient and the experimenter and a colouring picture was provided in each envelope to reduce donations through guilt avoidance) yet children, rather than taking the opportunity to be selfish without repercussions, persisted in donating. This suggests that if altruism is learned rather than innate, this norm is internalised early in ontogeny and quickly results in spontaneous implementation.

The findings from the present study are also in line with those from work with adults, who give a mean of approximately 25% of the endowment, with over 60% of participants choosing to make an allocation (Camerer, 2003; Levitt & List, 2007). Children in the present study give slightly less (17% of the endowment in the 4 condition and 15% in the 10 condition) and less often (44% in the 4 condition and 42% in the 10 condition choosing to donate) than do adults. This is consistent with the idea that altruism increases with age (Benenson et al., 2007; Harbaugh et al., 2003). Note that there was no effect of age in the present study, but this was most likely due to the small age range in question: previous findings of an increase in altruism with age have examined a much wider range of ages (Benenson et al., 2007; Harbaugh et al., 2003).

2.4.2 Sibling status

The present study has demonstrated that when sibling groups are clearly delineated, an effect of sibling status can be observed in the altruistic behaviour of 4-5 year-olds. While patterns of donations were similar in both the 4 condition and the 10 condition, the effect of sibling status only reached significance in the 4 condition. While a difference in the influence of sibling status according to endowment size was unexpected, this finding is consistent with Hay, Castle, Stimson and Caplan (1991), who state that individual

differences emerge under conditions of scarcity. It has been suggested that sibling effects can only be observed in within-family studies as they are too subtle to be elicited by between-family studies (Ernst & Angst, 1983). The present study examined sibling status between-family: perhaps constraining options in the 4 condition and essentially forcing participants to choose between selfishness and generosity evokes a sibling effect that is otherwise too subtle to be observed in a between-family study.

The strongest sibling effect was found in the overall donation profile in the 4 condition with lastborns donating significantly more than both firstborns and singletons, who did not differ in their donations. When this profile was decomposed into the decision to donate and the size of positive donations, it could be seen that the overall effect was driven by the decision to donate. Lastborns were found to choose to donate more often than both singletons and firstborns (with no difference between these groups), although the difference between lastborns and singletons did not quite reach significance, possibly due to the small size of the singleton group. There was no effect of sibling status on positive donations: once the decision to donate had been made sibling status did not influence the amount that was given. This may be due to lastborn children internalising a sharing norm earlier than children without older siblings, causing them to be more likely to choose to make a donation in the DG, but not influencing the amount given once that decision has been made. This has yet to be directly examined in children, but there is evidence of such a distinction in adults. Saunders and Lynn (2010) examined the influence of helping motives and social norms on altruistic behaviour in South Africa, as demonstrated by tipping car guards. Consistent with the present findings, they found that social norms were related to whether or not people chose to tip but not tip size, while helping motives were related to tip size but not the decision of whether or not to tip.

Despite SES having been posited to be responsible for many differences attributed to sibling status (e.g. Ernst & Angst, 1983; Rodgers et al., 2000), the observed effect of sibling status cannot be explained by SES. SES was negatively related to the decision to donate – the higher the SES, the more likely the child would donate nothing – however, logistic regression confirmed that in the 4 condition only, possession of older siblings influenced donation decision and this was independent of SES, which made a separate contribution to altruistic behaviour. While there were differences in SES according to sibling status, these were not consistent with the observed altruistic behaviour and are unlikely to be a confounding factor. Were SES to be driving the sibling effect one would expect firstborns (highest SES) to donate least often and singletons (lowest SES) most often, when in fact these two groups did not differ in terms of donations – it is lastborns, who lie between these two groups on SES, who donated most often. There was no effect of SES in the 10 condition, consistent with Benenson et al. (2007), who found no effect of SES on 4-year-olds' donations in a 10-sticker DG. Like lastborns, low SES children may also internalise and act upon a sharing norm earlier than high SES children as, having fewer resources available, low SES children have a greater necessity to share resources. This influence may, like the influence of siblings, be more readily observable under conditions of scarcity when response options are limited. Beneson et al. found that by 9 years of age, high SES children donate more than low SES children and suggest that high SES children adopt stronger fairness norms. This opposite effect may be due to differences in the calculation of SES or may represent an interaction between age and SES. Sharing norms may become more strongly ingrained with age, while high SES children experience a decrease in the value of stickers as they become increasingly aware of their greater resources and therefore experience a sharper increase with age in their likelihood of donating than low SES children. However, consistent with the present findings, Kameda, Takezawa and Hastie (2005) found low SES university students to be more likely than high SES students to endorse an

egalitarian norm over a merit-based norm as they have fewer safeguards to manage resource uncertainty. In addition, Carpenter et al. (2005) found that adults showed a 9% reduction in DG allocations with every standard deviation increase in family income, which is often used as a proxy for SES. As such, the pattern observed in the present study of lower SES children being more likely to donate may continue into adulthood.

Interestingly, it seems that at this young age it is not simply the possession of siblings that influences altruistic behaviour, but rather the possession of older siblings. Firstborns, who have spent part of their lives as only children, did not show a benefit of possessing siblings and behaved similarly to singletons, who both donated less often than lastborns; whether this effect obtains throughout childhood and into adulthood warrants further investigation. It is likely that the younger siblings of firstborns are too young to influence their older siblings' behaviour at this age. As the firstborns age and their siblings begin to exert more of an influence, the difference between firstborns and lastborns may disappear. Whether singletons ultimately catch up as their social experience increases also merits further investigation. However, the observed effect also seems to be a product of siblings in particular rather than general socialisation – at this age there is no effect of time spent with peers on altruistic behaviour in the DG. This lack of relationship observed between time with peers and altruistic behaviour may in fact reflect insufficient detail in parents' report. Inaccuracies and variability in questionnaire responses may have influenced findings, and the measure did not distinguish between same-age and older/younger peers – Benenson, Markovits, Roy and Denko (2003) suggest that similarity in age is important for peers to influence sharing as they have similar perspectives. Alternatively, peers may have an increasing influence as children get older and the total time spent in their company increases, or there may be a critical amount of interaction needed before peers have an

effect. Should this be the case, singletons would be expected to catch up with lastborns in time.

The relationship between possession of older siblings and altruistic behaviour is consistent with the majority of previous studies that examine the influence of sibling status. Possession of older siblings has been demonstrated to be related to a greater likelihood of possessing a prosocial social value orientation (Van Lange et al., 1997) as well as an increase in altruism as measured on the Agreeableness scale of the NEO-PI-R (Jefferson et al., 1998; Saroglou & Fiasse, 2003). However, the only previous study to directly examine the influence of sibling status on altruistic behaviour found the opposite pattern of results – lastborns were the least generous and singletons the most generous (Fehr et al., 2008). Fehr et al. attributed the discrepancy between their findings and those of previous studies to their use of a behavioural measure over questionnaires; however, the fact that the present study also made use of a behavioural measure and its findings are consistent with the questionnaire studies casts doubt upon this explanation. Their results may be due to the specific behavioural task chosen by Fehr et al., although why limiting the child to a forced choice between selfishness and generosity would invert the direction of sibling differences is difficult to explain. Rather, it may be that Fehr et al.'s treatment groups were not appropriately counterbalanced due to the post hoc acquisition of sibling data and their results were consequently skewed. Further study is necessary to confirm whether this is the case.

2.4.3 Confounding variables

No relationship was found between altruistic behaviour on the DG and mathematical ability as measured in the equal division task (making equal splits) and the same/more task (discriminating numerosities). This may be due in part to the efforts made to make the task as accessible as possible to such young children. Controlling the area subtended by the stickers to avoid a confound between area and number, as well as placing the stickers on an array so that the children were able to keep track of how many stickers they had removed and how many remained, may have abolished any differences between the children attributable to mathematical ability. Alternatively, the maths tasks chosen may simply have been too easy; indeed, 44% of children performed at ceiling and even the lowest-scoring child achieved 66% correct. Addition of more challenging tasks such as mental arithmetic would give greater variability in mathematical performance but these more complex tasks would not only reflect those abilities necessary for the DG. They would instead be likely to tap into underlying abilities such as working memory and processing speed (Bull & Johnston, 1997; Bull & Scerif, 2001). Children had little trouble with the mathematical tasks in the present study and the lack of relationship between these abilities and DG behaviour indicates that individual differences in the abilities required for the DG do not account for the performance of young children on this task.

Two iterations of the DG were conducted, one with a standard endowment of 10 stickers and one with a reduced endowment of 4 stickers. The 4 sticker condition was an attempt to make the task less cognitively demanding by keeping the numerosities to be dealt with within the limits of subitizing ability. Contrary to expectations, there were no differences in donation behaviour between the 4 condition and the 10 condition, suggesting that children have no more difficulty dividing the endowment in the 10 condition than they do in the 4 condition. It is unclear whether there would have been a difference between the conditions

had not the steps described above been taken to make the task accessible to the young children, although a facilitated split with 10 identical stickers placed in two horizontal lines did not influence DG allocations compared to when the stickers were placed in a circle (Blake & Rand, 2010). Studies in adults have also found that endowment size does not influence DG allocations (Carpenter et al., 2005; Forsythe et al., 1994; List & Cherry, 2008) – it seems likely that the 4 and 10 conditions are truly comparable in terms of DG donations. Greater variability in behaviour is provided by a larger endowment, which is essential for experimental manipulation of DG variables in order to allow for increases or decreases in donations depending upon the manipulation in question. Nonetheless, a smaller endowment size provides broadly comparable results yet seems to tease out individual differences (see section 2.4.2), with the added bonus of reducing the resources required. Further study should therefore be conducted to inform whether use of smaller endowments would prove useful for eliciting individual differences in DG behaviour.

Although sibling status did not have an effect on the amount donated by those who chose to make a donation, positive donations were influenced by ToM ability as assessed by first-order false belief understanding: with increasing ability, donation size decreased. This finding is not entirely surprising as, despite previous studies that examined the influence of ToM ability having found no impact on DG donations in typically-developing children (Lucas et al., 2008; Sally & Hill, 2005), high ToM ability did decrease donations in a DG-like task (Froming et al., 1985) and children on the autistic spectrum (Sally & Hill, 2005). Froming et al. suggested that children with a high ToM (as measured by role-taking) were able to take advantage of the anonymity of the situation, as high ToM children donated more than low ToM children when the experimenter observed donations. It is also possible that children with better ToM have a superior understanding of their own minds as well as those of others, causing them to be more able to predict the consequences for themselves when

making an allocation and realise that donating more is not in their own best interests. Alternatively, consistent with Sally and Hill's suggestion that first-order false belief is necessary for strategic responding, children with a better ToM may have a greater understanding of the implications of making a token donation, that making a donation fulfils the altruistic norm at minimal cost to themselves, and therefore choose to give a smaller amount. Given that the relationship with ToM in the present study was only significant with positive donations, this seems plausible.

Contrary to previous findings that possessing older siblings accelerated ToM development, sibling status did not influence composite ToM ability in the present study. When the tasks were examined individually, there was no influence of sibling status on the deceptive box task, while singletons scored significantly lower than firstborns on the Sally/Anne task, with no difference between firstborns and lastborns. This is consistent with McAlister and Peterson (2007) and supports the idea that when a difference according to sibling status arises, ToM ability is boosted by possession of siblings, whether older or younger.

Gender had little direct impact upon altruistic behaviour, but in line with expectations those gender differences that were observed showed girls to be more altruistic than boys. No overall gender differences were found in the 4 condition, but in the 10 condition there was an effect on the decision to donate that just failed to reach significance, with girls choosing to donate more often than boys. There was not a significant effect of gender on positive donations in either condition, but when examining the means we can see that those boys who chose to donate gave a mean of 39.44% of their endowment in the 10 condition, a slightly higher proportion than the 33.10% from those girls who chose to donate. This can be interpreted as girls making more token donations than boys (i.e. only one or two stickers) in the 10 condition – the slightly higher level of positive donations in

boys may therefore not be due to boys being more generous than girls, but rather may demonstrate a decrease in token donations as they choose to donate less often (See Figure 2.6).

Examination of the impact of gender when looking at the proportion of most and least favourite stickers donated helps to explain the effects observed above. There was no effect of sticker preference for boys but girls were found to donate more of their least favourite stickers in both conditions. These findings imply that girls are more likely to supplement their allocations with their least preferred stickers, and taken together with the findings above, suggest that girls demonstrate a more sophisticated understanding of the nuances of altruism – that one can make an altruistic response whilst minimising the cost to the self.

2.4.4 Mechanisms of sibling influence

While the present study cannot confirm the influence of different mechanisms of sibling influence, which can only be distinguished with further investigation, the findings are inconsistent with the following mechanisms described in Table 2.1: differences in parental investment, birth order stereotypes and dominance hierarchy effects. The parental investment mechanism predicted that a child's outcome would decline the later in the constellation she was born, yet firstborns and singletons behaved similarly while lastborns, who would be expected to be the least generous due to having the least parental investment, were the most generous. Perhaps differences in terms of parental investment are minimal at this young age and only become apparent later in life as inequities have had the opportunity to accrue. Should this be the case one would expect the predicted pattern to emerge with age, although it seems unlikely that this will occur given that the children who should have been the most generous were the least generous. In terms of birth order stereotypes, singletons are stereotyped to be selfish yet they behaved comparably to

firstborns, about whom there is no such stereotype. It is possible that firstborns, due to having been singletons for a portion of their lives, are conforming to the singleton stereotype and have not yet adjusted to the presence of siblings. If this were the case, the difference between firstborns and lastborns may lessen or even disappear with age; however, were this to be the case it could be due to stereotypes reflecting a real-world difference rather than the difference being due to the stereotype. Indeed, while conforming to a gender stereotype, for example, may help an individual to fit in socially, it is hard to see a similar benefit to conforming to the stereotype of being selfish. The greater altruism of lastborns was consistent with the dominance hierarchy model, but singletons, rather than being intermediate in terms of generosity due to their inexperience with power imbalances, were the least generous. It may be that dominance hierarchy effects only influence children with siblings, in which case the observed pattern is consistent with the mechanism. Replication of the study with adults would confirm whether this was the case as lastborns would continue to show more altruistic behaviour than firstborns.

The results of the present study are consistent with the following mechanisms from Table 2.1: niche partitioning, deidentification, teaching and behavioural modelling. Niche partitioning states that younger siblings choose to be more altruistic in order to distinguish themselves from their older siblings. Should this be the case then this difference is likely to be stable with time and persist into adulthood; further study with older children and adults would confirm this. The different patterns exhibited by lastborns and firstborns is consistent with deidentification and the idea that lastborns are more generous in order to establish an identity distinct from that of their siblings. Should the difference between lastborns and firstborns be due to deidentification, it would be expected to continue into adulthood and perhaps even increase as people continue to seek to establish a distinct identity. Similarly, the difference between firstborns and lastborns is consistent with both

teaching and behavioural modelling, as lastborns are likely integrate altruistic norms earlier than firstborns due to their experience with siblings from birth. Examining adults' behaviour would help to reveal whether modelling contributes to altruistic behaviour, as firstborns continuing to be less altruistic and lastborns more altruistic would be inconsistent with lastborns modelling their older siblings' behaviour. Similarly, in this event direct teaching would seem implausible as a selfish teacher is unlikely to advocate generosity. Of course, older siblings may indirectly teach altruism through demanding more resources at home (i.e. causing conflict), leading lastborns to acquiesce and learn that altruism leads to harmony as suggested by Van Lange et al. (1997) in their sibling-prosocial hypothesis. However siblings exert their influence, it seems plausible that they influence children's acquisition of personal altruistic norms. The present study has demonstrated that this can occur far earlier than suggested by Cialdini et al. (1981) as children donated their stickers even in the absence of external observation; lastborns are likely to do so earlier than singletons and firstborns, presumably due to socialising with an older sibling from birth as the effect is independent of time spent with peers.

In addition to examining whether the influence of siblings changes with time, future work should observe the influence of the number of siblings upon altruistic behaviour. There was not enough variability in sibling numbers in the present study to examine this (only two children possessed more than two siblings), particularly in firstborns as their siblings are so young. Nonetheless, having more siblings present at home will increase socialisation time, potentially increasing the likelihood that an altruistic personal norm will be acquired. Within-family study would be particularly illuminating as it would reveal similarities and differences in related siblings' behaviour that are missed with the present type of between-family study.

In sum, the present study has demonstrated that under conditions of scarcity, 4-5 year-old children possessing older siblings are more likely to donate in the DG. Although low SES children are also more likely to donate, the effect of sibling status is independent of SES, while high ToM decreases the amount donated by those who choose to make a donation. Girls are more likely to donate than boys and show more sophistication in their donation behaviour. DG behaviour is independent of mathematical ability and time spent with genetically unrelated peers. The finding that siblings influence altruistic behaviour does not mean that parents, other family members and other social interactions are not important to the development of altruism (see Jellal & Wolff, 2002). Indeed, the influence of siblings is likely to be mediated at least in part by parents exhorting their children to cooperate and share; however, the present study has demonstrated that older siblings provide an important and often-overlooked contribution to young children's altruistic development.

While the finding that possession of older siblings contributes to the expression of altruistic behaviour in 4-5 year-old children is undoubtedly noteworthy, it must be borne in mind that sibling status is only one of a number of facets of the sibling constellation that may be influential. In order to fully understand older siblings' influence upon altruistic behaviour, it is important to examine the relative impact of such factors as the number of siblings, the age difference between siblings, gender of siblings and gender congruence (i.e. whether siblings are the same gender as the child or not), not to mention those aspects that were excluded from the present study – middleborns and multiple births. All of these factors may modulate altruistic behaviour in different ways. For instance there is evidence to suggest that possessing a sister rather than a brother increases the likelihood of developing a prosocial SVO (Van Lange et al., 1997). In addition, the stability of this effect over time should be explored as it is possible that singletons and firstborns may compensate later in life with increasing experience with peers and, in the case of firstborns, siblings who will

provide increasingly valuable input as they move from infancy and through childhood. Studying whether and how the impact of siblings changes into adulthood would also serve to help distinguish between the various mechanisms by which siblings may influence altruistic behaviour. This can be achieved by replicating the present study with a group of adults and comparing their performance to that of children and will be the focus of Chapter 3.

Chapter 3: Sibling status and the dictator game in adults

3.1 Introduction

In the previous chapter, the dictator game (DG) was used to demonstrate an effect of possession of older siblings upon altruistic behaviour in 4-5 year-old children. This was one of the first studies to examine the influence of sibling status upon a behavioural measure of altruism in children; however, this relationship has yet to be assessed in adults. In the present chapter the DG was conducted with a sample of adults in order to observe the stability of the influence of siblings into adulthood, allowing discrimination between the various mechanisms of sibling influence that may be driving the relationship.

3.1.1 The influence of siblings in adults

The influence of sibling status upon adults' behaviour is rarely examined as it is often assumed that it is only when interactions are frequent that siblings exert an effect, i.e. when a child is living with their siblings. Moreover, a number of authors assert that any influence exerted by siblings is apparent only in the context in which it was originally exhibited and therefore disappears once the child leaves the family home (Ernst & Angst, 1983; Harris, 2000; Kitzmann et al., 2002). Even Sulloway, who advocates the concept that sibling status has a long-term influence upon personality, states that many of the effects of sibling status are latent in adulthood and may require intense emotions or familial cues in order to be precipitated (Sulloway, 2007). Given the specificity of circumstances that seem to be necessary to produce a sibling effect in adults, one might expect differences in adult behaviour according to sibling status to be rare and perhaps even specious. Nonetheless, robust sibling effects have been observed across a variety of cognitive and personality variables.

The relationship between sibling status and IQ has been of interest to researchers for many years, and while some researchers maintain that any between-family association between the two is simply a factor of confounding variables such as SES and educational level (Rodgers et al., 2000), relationships have nonetheless been observed in large, well-controlled studies. Kristensen and Bjerkedal (2007) examined birth order effects upon IQ in male Norwegian conscripts, comparing biological birth order to functional birth order. Biological and functional birth order are not necessarily the same; for instance a child may have been born second in the sibling constellation but raised first due to the death of the older sibling. The child would therefore be biologically secondborn but functionally firstborn. Kristensen and Bjerkedal found both biological and functional birth order to influence IQ, with IQ declining the later in the constellation the child was born. However, once functional birth order was controlled, the relationship with biological birth order disappeared, suggesting that it is the social impact of rearing order that causes birth order differences rather than biological changes. In a highly representative Norwegian sample of 1.5 million participants, Black et al. (2005) found a strong effect of birth order on educational attainment that was of a similar magnitude whether assessed within-family or between-family. As women showed a larger effect than men, it is possible that Kristensen and Bjerkedal's finding that functional birth order is important may also extend to women.

In a longitudinal study of episodic memory, Holmgren et al. (2007) found that adults had a better outcome the earlier in the sibling constellation they were born. This effect was robust over time, both in terms of the five year period of the study and across the age cohorts tested (adults between 35 and 80 years). This demonstrates that sibling status can continue to be influential over the course of adulthood and not just in the childhood years. This should perhaps not be surprising – siblings are a constant throughout an individual's life and people make an effort to keep in contact with their siblings for the simple reason

that they are related to them. Cicirelli (1982) notes that it is very unusual to break contact entirely with siblings, while most people meet up with siblings several times a year, often in gatherings of the entire family. It seems reasonable to suppose that roles adopted within the family are therefore regularly reinforced (indeed, it is common to have surviving siblings until late in life) and should a sibling effect extend beyond the context of the family, it is likely to continue throughout life.

When comparing adults with and without siblings, singletons are found to be broadly similar to adults with siblings on a variety of measures. Kwan and Ip (2009) found that Chinese adults who had been raised in only child families (who are more common in China than elsewhere due to the one child policy) were generally similar to those with siblings, and even exceeded them in terms of health, life satisfaction and charitable donations. A meta-analysis conducted by Polit and Falbo (1987) supports this finding, and they suggest that singletons may in fact have an advantage over adults with siblings due to better quality and quantity of parental interaction. Riggio (1999) found singletons to be marginally more Neurotic (as measured by the Eysenck Personality Questionnaire; Eysenck & Eysenck, 1975) than those with siblings, otherwise there were no differences in personality variables according to the possession of siblings, nor were there any differences in social skills as measured by the Social Skills Inventory (Riggio, 1989).

Sulloway (1996) conducted a meta-analysis of studies examining birth order effects on the NEO-PI-R measure of personality. He found firstborns to be high in Conscientiousness and Neuroticism, while laterborns were high in Openness to Experience and Agreeableness. Findings for Extraversion were less clear, with the facet of dominance being higher in firstborns while the facet of sociability is higher in laterborns. A number of studies have tested this finding and, as described in section 2.1.1, have come up with mixed results.

Freese, Powell and Steelman (1999) sought to explore Sulloway's assertion that firstborns are more conservative and supportive of authority. They found no support for this theory, as political attitudes from the US General Social Survey did not differ as a function of sibling status. Michalski and Shackelford (2002) compared firstborns and laterborns on a measure of five major personality dimensions – Surgency, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience (after Botwin, Buss, & Shackelford, 1997). They found very little support for Sulloway, with only Agreeableness and Openness showing an effect of sibling status. Consistent with Sulloway, firstborns were found to be less Agreeable, but contrary to Sulloway they scored higher on Openness. Jefferson et al. (1998) found that the effect of birth order depended upon the source of the personality rating. Self-report on the NEO-PI-R showed no difference between firstborns and laterborns on the five domains, although laterborns evaluated themselves as high in the facets of altruism and tendermindedness compared to firstborns. When rated by their peers, laterborns scored higher on Openness, Agreeableness and Extraversion, but when rated by their spouses there were no differences. The authors concluded that personality is largely unaffected by birth order.

Despite the studies above finding little or no support for Sulloway (1996), those that do find an effect of birth order on personality are commensurate with Sulloway in the direction of their effect. Beck, Burnet and Vosper (2006) conducted a within-family analysis of differences in extraversion according to birth order. Consistent with Sulloway, they found firstborns to be more dominant and laterborns more sociable. Paulhus et al.'s (1999) within-family comparison found firstborns to be more Conscientious, while laterborns were more Agreeable and Open to experience. These differences do not appear to be driven by birth order stereotypes as results were comparable whether or not stereotypes were elicited. Paulhus et al. suggest that birth order differences truly exist and that this is the

reason for the existence of birth order personality stereotypes, rather than stereotypes being self-fulfilling prophecies. Similarly, Healey and Ellis (2007) found that in pairs of siblings firstborns were more Conscientious and achieving and secondborns were more Open to experience, while Saroglou and Fiasse (2003) found that middleborns and lastborns, who are often grouped together in studies of sibling status, are quite distinct in terms of personality (as assessed by the NEO-PI-R) and school performance. Compared to firstborns and lastborns, middleborns were more impulsive, less conscientious and had poorer school performance. Lastborns, on the other hand, were the most agreeable and warm; in particular they scored higher than the other groups on the facet of altruism.

As described in section 2.1.1, Agreeableness, a personality dimension that contains the facet of altruism and is often stronger in laterborns (Jefferson et al., 1998; Saroglou & Fiasse, 2003; Sulloway, 1996), is related to an individual's volunteerism (Carlo et al., 2005). Lastborns have been found to be more risk-taking than firstborns, with middleborns the least likely to take risks (Wang, Kruger, & Wilke, 2009). Similarly, Courtiol et al. (2009) have found differences according to birth order in an investment game, an economic game which assesses cooperation (a prosocial behaviour that involves an element of risk). In an investment game, two participants are given identical endowments of money or points. Player A can give a portion of their choosing to a player B; once B receives the sum, it is multiplied by a set amount by the experimenter and then B is given the opportunity to return a sum of their choosing to A. There is an element of trust involved in A's decision as B may legitimately return nothing, and because of this the amount returned by B demonstrates reciprocity. Courtiol et al. found firstborns to be less cooperative, being less trustful and reciprocating less than other sibling types (middleborns, lastborns and singletons behaved similarly and were therefore grouped together). These findings demonstrate individual differences according to birth order can be observed in an

economic game conducted with adults that involves prosociality and furthers the possibility that adults' behaviour on the DG may alter as a function of sibling status.

There has been little direct study of the influence of sibling status upon prosociality in adults. Van Lange et al. (1997) found adults with a prosocial social value orientation (SVO) to have significantly more older siblings than both competitors and individualists, suggesting that laterborns are more likely to have a prosocial disposition than earlyborns. This disposition seems to translate into behaviour, as SVO is related to self-report of donation behaviour, with prosocials making charitable donations more often than competitors and individualists (Van Lange et al., 1997). Furthermore, prosocials are more likely to be high allocators in the DG (Israel et al., 2009) although, as noted in section 2.1.1, when SVO was assessed points were allocated that would later be redeemed for money. As hypothetical points are normally used in SVO assessment, Israel et al.'s measure would be more likely to reflect behaviour in the DG as decisions have a real-world impact for the participant. Nonetheless, if these findings are taken together with the sibling effect observed in 4-5 year-olds in Chapter 2, it is possible that adults' donations in the DG may be influenced by sibling status; however, the DG has yet to be used to examine birth order effects in adults.

3.1.2 Mechanisms of sibling influence

As outlined in Chapter 2.1.2, there are a number of mechanisms by which siblings are thought to influence their co-siblings: differences in parental investment, birth-order stereotypes, dominance hierarchy effects, niche partitioning, deidentification, teaching and behavioural modelling (see Chapter 2.1.2; Brody, 2004; and Sulloway, 2001, 2007 for descriptions of these mechanisms). Comparing the influence of siblings in children and adults can help to distinguish which of these mechanisms may be contributing to altruistic

behaviour. Given the young age at which children in Chapter 2 were tested, it is possible that the differences in altruistic behaviour between lastborns and other children may not hold into adulthood. Firstborns at age 4-5 years have only had siblings for a short time but as they age their experience with their siblings increases. In addition, the quality of this experience will also increase as the siblings move out of infancy and through childhood. These changes may lead to firstborns' altruistic behaviour changing accordingly, causing their behaviour to more closely resemble that of lastborns. Singletons, on the other hand, may catch up with lastborns as they progress through their schooling and spend more time with their peers. Conversely, lastborns may learn that a reduction in altruistic behaviour is socially acceptable and decrease their donations accordingly. Each of these potential outcomes (along with the possibility that the effect remains stable with age) is consistent with different mechanisms of sibling influence, while some outcomes are consistent with multiple mechanisms. Table 3.1 summarises predictions of DG behaviour for each of these mechanisms; predictions are derived from Sulloway (2001; 2007) and Brody (2004). These predictions are not all mutually exclusive; however, it is possible that there are multiple mechanisms working in concert.

3.1.3 Comparing DG behaviour in adults and children

While the DG has been used with children of varying ages, data have yet to be directly compared with those obtained from adults; however, studies have often found patterns broadly similar to those observed in adults. Harbaugh and Krause (2000) found that 6-12 year-old children donated on average 29% of their endowment of tokens (each worth 10 cents), an amount comparable to that observed in adults, who typically give 20-30% (Camerer, 2003). Benenson et al. (2007) conducted the DG with 4, 6 and 9 year-olds with an endowment of stickers, where children were asked to pick their favourite 10 stickers from a selection of 30. They found an effect of age, but this was only significant between the 4 and

9 year-olds, suggesting a gradual increase in altruistic behaviour. However, the authors note that even by 4 years the children donate approximately 25% of their endowment, an amount once again comparable to that observed in adults. It should be noted, however, that children were donating to members of their own class, i.e. children that they knew, even if they did not know to which individual they would be given. Four to six year-old children have been found to give more often to a friend than to an ingroup nonfriend or a stranger in a sharing game where they could choose one sticker each for themselves and another individual, or keep both stickers for themselves (Moore, 2009). Children's prosocial behaviour is clearly sensitive to social distance and as such, giving to a class member (thus reducing the anonymity and therefore the social distance between dictator and recipient) may have increased DG donations in Benenson et al.'s study.

While many studies have found similar rates of altruism in adults and children, there is a great deal of variability in children's DG behaviour across studies. Harbaugh et al. (2003) found levels of altruism to be much lower than typically observed in adults, with 7-18 year-olds donating a mean of 12% of their endowment of 10 tokens and a 2% increase in donation size with each additional year. This finding is consistent with the idea that altruistic behaviour increases across childhood and into adulthood. However, this mean is likely to have been artificially lowered by some children taking part in another economic game, the ultimatum game, beforehand and others afterwards – those that received the DG first donated significantly more than those where the DG followed the ultimatum game.

If it is the case that altruism truly increases with age, it is perhaps surprising that many studies with children have found higher rates of altruism in the DG than that generally observed in adults; however, these studies also often introduce methodological alterations

Table 3.1: Predictions of adult altruistic behaviour in the DG based upon mechanisms of sibling influence

Mechanism	Prediction of DG donations in adults <i>Predictions for 4-5 year-olds in italics</i>	Explanation
Differences in parental investment	Singletons > firstborns > lastborns <i>Singletons > firstborns > lastborns</i>	As more siblings are born, parental investment is reduced and outcome declines
Birth-order stereotypes	(Firstborns = lastborns) > singletons <i>(Firstborns = lastborns) > singletons</i>	Singletons are often stereotyped as being selfish (see Mancillas, 2006); stereotypes with regard to firstborns and lastborns generosity have not been described therefore it is likely that there is no difference
Dominance hierarchy effects	Lastborns > singletons > firstborns <i>Lastborns > singletons > firstborns</i>	Lastborns, having less power, use agreeableness and generosity to compensate; singletons, whose only experience of a power imbalance is with their parents, are expected to lie between firstborns and lastborns
Niche partitioning	(Singletons = firstborns) < lastborns <i>(Singletons = firstborns) < lastborns</i>	Firstborns are akin to singletons as they are essentially singletons until a sibling is born; laterborn siblings seek to distinguish themselves by increasing their agreeableness and generosity
Deidentification	Firstborns ≠ lastborns <i>Firstborns ≠ lastborns</i> No prediction for singletons <i>No prediction for singletons</i>	Siblings reduce rivalry by diverging from their adjacent siblings. No prediction of direction can be made from this mechanism alone, simply that siblings will differ, therefore no prediction can be made with regard to singletons. Outcome is likely to be modulated by the number of siblings as the child deidentifies from their immediately adjacent sibling
Teaching	(Firstborns = lastborns) > singletons <i>Lastborns > firstborns > singletons</i> OR Singletons = firstborns = lastborns <i>(Lastborns = firstborns) > singletons</i>	Firstborns pass on behavioural norms that they themselves have internalised. Lastborns may therefore internalise these norms at an earlier age but by adulthood firstborns will be comparable. Singletons may be less likely to internalise these norms due to their lack of experience with siblings; alternatively, they may acquire the norms as experience with peers increases.
Behavioural modelling	(Firstborns = lastborns) > singletons <i>Lastborns > firstborns > singletons</i> OR Singletons = firstborns = lastborns <i>(Lastborns = firstborns) > singletons</i>	Lastborns copy firstborns' behaviour. Once again, lastborns may show this behaviour at an earlier age but by adulthood firstborns will be comparable. Singletons may be less likely to show the behaviour due to their lack of experience with siblings; alternatively, they may acquire the behaviour as experience with peers increases.

that may contribute to these discrepant results. Gummerum et al. (2008) found that 8-17 year-olds donated 35-40% of their monetary endowments, an amount approximately three times as much as the mean donation in Harbaugh et al.'s (2003) 7-18 year-olds and with no impact of age on donations. Indeed, this is a higher mean than that typically observed in adults. However, this difference may be due to the children making the decision of how much to donate in groups of three, making social desirability a consideration. The authors also suggest that differing cultural norms in their German sample may have an influence, in addition to the possibility that money is a less salient incentive to young children and hence more readily donated. Lucas et al. (2008) observed a mean donation of 40% of the pie in 4-5 year-olds, far higher than the 25% given by Benenson et al.'s (2007) 4-year-olds and approximately twice that given by adults. However, the children were offered ten identical stickers (potentially causing each additional sticker to have a lower value to the child than the last, leading to an increase in the likelihood that it is donated) and told that they must donate at least one. As most DGs offer the option to keep the entire endowment, leading to a significant proportion of zero donations, this alteration will of course inflate the size of the mean donation in comparison. Gummerum et al. (2010) have conducted the DG with the youngest sample to date, examining the behaviour of 3-5 year-olds when given ten identical stickers to distribute. They found a small but nonsignificant increase in donations with age, from a mean of 27% in 3-year-olds, to 31% in 4-year-olds and 43% in 5 year-olds. Once again, this is a larger amount than that observed in both adults and by Benenson et al. Similar to Lucas et al., these means may have been increased by offering ten identical stickers rather than allowing the child to choose different stickers that may have a higher personal value. While each individual coin may be identical in endowments of money, the coins can represent a variety of objects for which they may be exchanged and so using different stickers may be a more comparable currency for young children.

Despite the variability observed across studies, use of the DG in children has consistently demonstrated that they, like adults, are frequently altruistic in their behaviour. However, it is unclear the extent to which this behaviour is attributable to the influence of methodological differences across studies, while meaningful comparison of children's behaviour to that of adults requires use of a DG procedure that is as similar as possible across groups. The present study will therefore replicate the 4 condition from Chapter 2, in which sibling status was found to have a significant effect upon DG behaviour. The most frequently used endowment size used in adults is ten monetary units, or multiples thereof. As such, use of four monetary units (i.e. four pounds) in the current study is unusual. While the impact of endowment size has not been examined using this precise sum, it has consistently been found that subjects on average tend to allocate a fixed proportion of their endowment (approximately 25%), irrespective of endowment size (Carpenter et al., 2005; Dufwenberg & Muren, 2006; Forsythe et al., 1994; List & Cherry, 2008). As such, mean donations should be comparable to previous studies using the DG.

3.1.4 Confounding variables

A number of studies have examined the influence of gender upon adults' DG behaviour but findings remain inconsistent: while some studies found a gender difference in donations, many others found no gender effect (Ackert et al., 2009; Bolton & Katok, 1995). However, when a significant gender difference was present, women were generally found to be more generous than men (Eckel & Grossman, 1998; Kamas et al., 2008). However, gender differences in DG behaviour appear to be dependent upon the precise composition of the study. Andreoni and Vesterlund (2001) sought to examine gender differences in DG behaviour in greater detail by manipulating the relative value of the units of the endowment to the dictator and the recipient. In some cases the value was the same to both dictator and recipient, in others the dictator's allocation to the recipient was multiplied by a

fixed value before being transferred to the recipient (i.e. the sum was worth more to the recipient than the dictator and so altruism was 'cheap') and in yet others the dictator's allocation was divided by a fixed sum before being transferred to the recipient (i.e. the sum was worth less to the recipient than to the dictator, rendering altruism 'expensive'). Gender and price interacted, with DG behaviour differing depending upon the value of the units of the endowment. When value was consistent (as is the case in the standard DG) or when altruism was expensive, women donated more than men, while men donated more than women when altruism was cheap. Cox and Deck (2005), on the other hand, found men to be more consistent in their decision to donate than women across changes in cost and social distance, while women appeared more generous in low cost or low social distance situations (in this case, the term cost relates to the absolute amount given up by the participant with the proportion remaining fixed). As such, it is difficult to predict how gender will influence donations in the present study: it is possible that there will be no difference. Alternatively, it is plausible that women would be less likely to donate but more generous than men when they do so, as the value of one unit in the present study (with an endowment of four units) is proportionally higher than the value of one unit from an endowment of ten and so altruism can be viewed as expensive in the present study.

In Chapter 2 ToM ability was assessed as a potential contributing factor to children's altruistic behaviour. This ability to take another's perspective was found to be related to the amount donated in the DG by those who chose to make a donation, with superior ToM being associated with a reduction in donation size. Adults also vary in their perspective-taking ability, which is a component of more general empathic ability (Davis, 1980); empathy may also be related to altruistic behaviour. Batson and colleagues have advanced an empathy-altruism hypothesis, which states that both personal distress and empathic concern (two further components of empathy) can be the source of helping behaviours.

When personal distress outweighs empathic concern, the motive to help the victim is a selfish desire to alleviate one's own anxiety at the victim's plight. However, when empathic concern is the motivating factor, the desire to help the victim is altruistic as the individual wishes to alleviate the victim's distress rather than their own. Batson and colleagues have conducted numerous experiments in which they have manipulated the level of empathy elicited by a situation in which an individual requires help. Participants in the high empathy condition are more likely to help the individual than those in the low empathy condition, supporting the theory that empathy induces altruistic helping (Batson et al., 1981, 1991, 1995, 1997; see section 1.2.2). However, it has been suggested that prosocial behaviours such as helping are elicited by a sense of oneness with the victim rather than a sense of empathy for their plight (R. B. Cialdini et al., 1997; Maner et al., 2002). Maner et al. (2002) define oneness as a sense of shared identity with another person (mediated by perspective-taking ability; Davis, Conklin, Smith, Luce, 1996) in which self and other come to overlap. They suggest that this selfish motivation is the root of helping behaviour as when oneness is high the actor is essentially seeking to help himself. They found a significant relationship between empathic concern and helping; however, it disappeared once nonaltruistic factors such as oneness, sadness and personal distress were controlled. They suggest that measures of empathic concern cannot disentangle other-oriented emotion from general negative affect, and it is the latter that is associated with helping behaviours in previous studies. Comparison of DG performance with a measure of empathy, the Interpersonal Reactivity Index (IRI; Davis, 1980), would inform this debate as the nonaltruistic factors of oneness, sadness and personal distress should not be elicited by the anonymous DG. Should oneness with an imagined other be involved, a positive relationship between DG donations and perspective-taking would be expected as this ability mediates the sense of shared identity involved in oneness (Davis et al., 1996). Furthermore, a positive relationship between empathic concern and DG donations would provide additional support for the

notion that altruism can be induced by empathy, possibly through experiencing empathic concern for an imagined other. It should be noted that should a positive relationship with personal distress also emerge it would not necessarily be inconsistent with the empathy-altruism hypothesis. The hypothesis does not state that the individual does not feel personal distress, only that this feeling is not as strong as a feeling of empathic concern. Conversely, a negative relationship between IRI scores, particularly perspective-taking (which is the subscale that is the most comparable to ToM), and DG donations would be consistent with the findings in Chapter 2 and would suggest that adults who donate more are less able to assimilate and take advantage of the anonymity of the DG procedure due to their poorer mentalising abilities; however, this outcome seems improbable as adults are unlikely not to fully grasp such a simple task as the DG.

3.1.5 Present study

The present study aimed to explore whether the influence of possession of older siblings upon altruistic behaviour observed in Chapter 2 persists into adulthood. While no previous study has directly compared sibling status and DG performance, the birth order literature demonstrates that adults can show personality and behaviour differences attributable to their sibling status despite no longer being in the familial context. While not all studies show an effect of birth order, those that do demonstrate that lastborns are more likely to exhibit a prosocial SVO and score higher on the altruism facet of Agreeableness. As such, adults are likely to show a difference between lastborns and firstborn sibling groups in DG performance comparable to that observed in the 4-5 year-olds in chapter 2. However, should the difference between firstborns and lastborns observed in children be due to firstborns' relative lack of high quality interactions with their siblings, it is possible that this difference will disappear in adults as they and their siblings age. Singletons will obviously not be able to show an increase in donation behaviour attributable to siblings ageing, and

may therefore become the least altruistic group; alternatively they may benefit from an increase in interactions with their peers and may therefore also increase their donations on the DG. Given that altruistic behaviour is generally found to increase with age, it is likely that adults will donate more than children.

In order to further examine the relationship between mentalising ability and altruistic behaviour, participants completed the IRI questionnaire (Davis, 1980). Gender was counterbalanced where possible in order to minimise its impact on potential sibling differences; however, due to low numbers of singletons this was not possible for this group. As in Chapter 2, a measure of SES and time spent with peers as a child was taken in order to ensure that these variables were not driving any observed differences.

3.2 Methods

3.2.1 Participants

78 adults (mean age 21:7; age range 17:1 to 36:4) participated in the study. Participants were recruited through advertisement across the University of Nottingham campus. Following participation, participants were assigned to sibling status groups according to their responses on the questionnaires (see Procedure for details of the questionnaires and Table 3.2 for sample characteristics).

Table 3.2: Sample characteristics across sibling status in adults (standard deviations in parentheses; ranges in italics)

	Singleton	Firstborn	Lastborn	Group differences
Total n	16	24	38	
Gender/female:male	11:5 ⁵	12:12	19:19	
Mean age/months	268.19 (42.32) <i>229-377</i>	255.67 (28.77) <i>205-334</i>	257.92 (34.54) <i>220-436</i>	$H(2)=0.66; p=.72$
Mean SES ⁶	50.49 (31.37) <i>5.50-96.75</i>	59.95 (24.56) <i>18.91-99.01</i>	58.39 (29.76) <i>0.18-99.59</i>	$H(2)=1.20; p=.55$
% experienced childcare	68.75	66.67	57.89	$\chi^2(2)=0.79, p=.71$

3.2.2 Procedure

Once consent had been obtained, each participant completed one iteration of the dictator game followed by a set of questionnaires: one giving personal details such as date of birth, gender, home post code and sibling status; and the Interpersonal Reactivity Index (IRI; Davis, 1980). The experimenter gave the participant a set of instructions (see Appendix 3)

⁵ There were insufficient numbers of singletons recruited to allow a balance of gender for this group. However, should this imbalance have an influence on DG performance, we would expect an increase in donations as there were more women than men. As Figure 3.2 shows, the results for singletons are not consistent with this prediction, therefore we do not consider this to be a confound and, due to the low number of participants, the whole group was retained.

⁶ This refers to current SES. While the post code of participants' longest place of residence as a child was also requested, there was a large amount of missing data. The data collected was consistent with the adult SES so only adult SES was therefore analysed.

which she then explained verbally to ensure full understanding. The experimenter then gave the participant their questionnaires and their coins, which served as their endowment in the DG (see procedure below), and left the room to allow complete anonymity; she returned once the participant had completed both the DG and the questionnaires. Finally, the experimenter debriefed the participant and entered their details into a £20 prize draw as an inconvenience allowance for their participation.

3.2.2.1 Dictator game

Participants were presented with four £1 coins and informed that they were theirs to keep but if they wished they could anonymously give some to another person. They were given two envelopes, and asked to divide the coins as they saw fit between them. The envelope for the coins the participant wished to keep was marked “take this envelope with you” while the envelope for donations to an anonymous other was marked only with an individual number in order that any donations could be matched with the appropriate questionnaire. It was stressed that this number could never be traced back to the individual participant and that this code was present to ensure complete anonymity. Each envelope contained a Sudoku puzzle so that no-one received nothing in their envelope, reducing donations through guilt avoidance in a comparable fashion to the colouring picture in Chapter 2. The donated envelope was posted into a locked postbox, while the participant’s envelope was placed in a bag or pocket out of sight of the experimenter. The participant was informed that the donated envelope would be passed on to a random person on campus.

3.2.2.2 Questionnaires

Upon completion of the dictator game, the participant turned over and completed a set of questionnaires. The first questionnaire detailed the participant’s date of birth, gender,

course, post code, sibling status and details of time spent with peers⁷ (see Appendix 4). The participant then completed the IRI, a 28-item questionnaire comprising four constructs related to empathy: fantasy (tendency to identify with fictional characters), empathic concern (tendency to feel concern or sympathy for someone else), perspective-taking (ability to take another person's point of view) and personal distress (tendency to feel anxious in response to another person's distress). Items were rated on a five point Likert scale from 0 (does not describe me at all) to 4 (describes me very well) and each construct was scored out of a maximum of 28. See Appendix 5 for the IRI and Appendix 6 for alpha coefficients for the IRI. When the questionnaires had been completed the participant sealed them into an envelope with a matching number to that on the donation envelope and posted it into the locked box.

⁷ As all participants who reported spending time with peers referred to time in childcare, with little knowledge of length of time, this was converted to the dichotomous variable of whether or not an individual spent time in childcare with other children.

3.3 Results

Data were examined for skewness and kurtosis. As data were not normally distributed, non-parametric statistics were employed. An alpha level of .05 was used for all statistical tests. In order to be conservative in the analyses, all tests were two-tailed.

3.3.1 Interpersonal Reactivity Index

Data were first examined for the group as a whole, with intercorrelations being conducted between the scales of the IRI. All of the variables significantly correlated with one another, with the exception of Personal Distress and Empathic Concern (see Table 3.3).

Table 3.3: Intercorrelations between IRI scales for the group as a whole

	Perspective taking	Empathic concern	Personal distress
Fantasy	$r=.24, p=.04$	$r=.54, p<.001$	$r=.29, p=.01$
Perspective taking		$r=.38, p=.001$	$r=.27, p=.02$
Empathic concern			$r=.07, p=.57$

Intercorrelations were then conducted between the scales of the IRI for each gender and compared to the original intercorrelations of Davis (1980). The test for differences between two r values reveals that there were no significant differences between the intercorrelations of the present study and those from Davis (1980), with the exception of the correlation between Personal Distress and Fantasy for males, which was significantly stronger in the present study (see Table 3.4). As such it can be safely assumed that as a group the participants in the current study responded normally and comparably to those in Davis' original study.

Table 3.4: Intercorrelations between IRI scales by gender for the present study (top value) and for Davis (1980; in parentheses), with z-scores representing the difference between the two r values.

Males	Perspective taking	Empathic concern	Personal distress
Fantasy	$r=.09$ ($r=.10$) $z=-0.06$; $p=.95$	$r=.43$ ($r=.30$) $z=0.20$; $p=.40$	$r=.54$ ($r=.16$) $z=2.47$; $p=.01$
Perspective taking		$r=.32$ ($r=.33$) $z=-.06$; $p=.95$	$r=.12$ ($r=-.16$) $z=1.58$; $p=.11$
Empathic concern			$r=.37$ ($r=.11$) $z=1.55$; $p=.12$
Females	Perspective taking	Empathic concern	Personal distress
Fantasy	$r=.26$ ($r=.12$) $z=0.88$; $p=.38$	$r=.55$ ($r=.31$) $z=1.80$; $p=.07$	$r=-.07$ ($r=.04$) $z=-0.67$; $p=.50$
Perspective taking		$r=.37$ ($r=.30$) $z=0.48$; $p=.63$	$r=-.08$ ($r=-.29$) $z=1.32$; $p=.19$
Empathic concern			$r=.04$ ($r=.01$) $z=0.18$; $p=.86$

Data were compared across sibling groups for the total IRI score and the individual IRI subscales (see Table 3.5). There were no significant effects of sibling status for IRI total ($H(2)=0.57$, $p=.75$), fantasy ($H(2)=1.01$; $p=.60$), empathic concern ($H(2)=0.89$; $p=.64$) or perspective-taking ($H(2)=3.47$; $p=.18$). There was a significant effect of sibling status on personal distress ($H(2)=7.56$; $p=.02$); post-hoc Mann-Whitney analyses revealed that firstborns scored significantly lower than lastborns on personal distress ($U=261.50$, $p=.004$) while there were no differences between singletons and firstborns ($U=147.50$, $p=.22$) or singletons and lastborns ($U=261.00$, $p=.42$).

Table 3.5: IRI scores across sibling groups in adults (standard deviations in parentheses)

		Singletons	Firstborns	Lastborns	Group differences
Interpersonal Reactivity Index	Mean fantasy	17.56 (4.31)	17.62 (5.38)	16.68 (5.31)	$H(2)=1.01; p=.60$
	Mean empathic concern	18.12 (4.27)	19.42 (4.86)	18.55 (3.98)	$H(2)=0.89; p=.64$
	Mean perspective-taking	19.44 (4.56)	16.71 (4.46)	17.24 (4.22)	$H(2)=3.47; p=.18$
	Mean personal distress	13.00 (5.34)	10.77 (5.13)	14.63 (5.06)	$H(2)=7.56; p=.02$ Firstborns<lastborns ($U=261.50, p=.004$)
	IRI total	67.33 (11.91)	64.58 (14.20)	67.11 (13.10)	$H(2)=0.57, p=.75$

3.3.2 Prosocial behaviour

As in Chapter 2, data were first examined in terms of the *overall donation profile* (i.e. the proportion of their endowment donated by each adult). This was then broken down into analyses of the *decision to donate* (i.e. donating nothing or donating one or more coins) and the proportion of endowment donated by only those who chose to donate (hereafter *positive donations*). Overall, adult participants donated 10.26% (s.d.=16.33) of their endowment. 32.05% of participants chose to make a donation while the mean donation by those who chose to donate was 32.00% (s.d.=11.46). See Figure 3.1 (grey bars) for the distribution of donations.

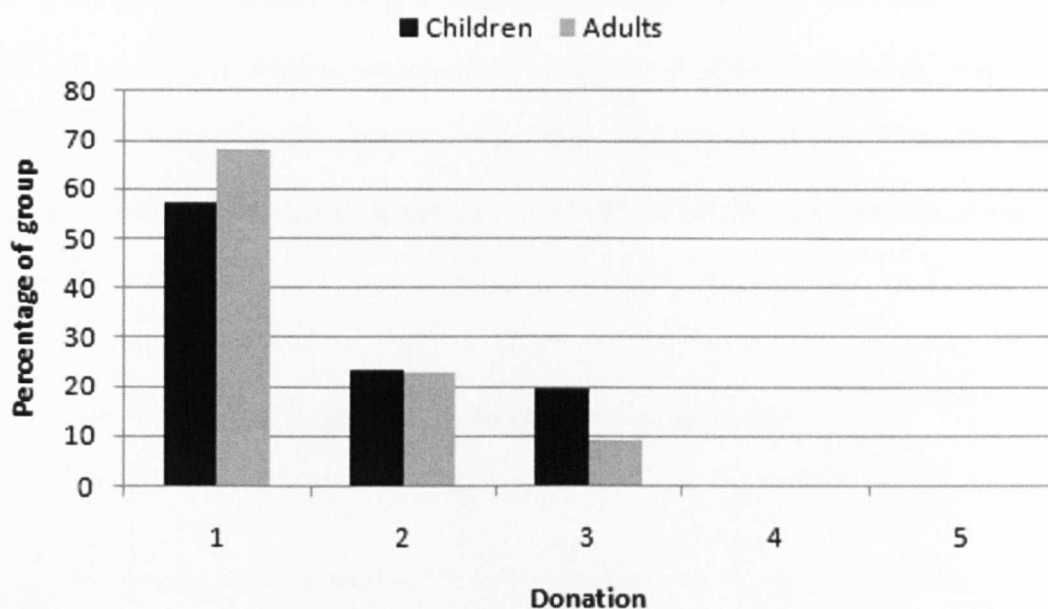


Figure 3.1: Donation distributions for children and adults

3.3.2.1 Gender

Mann-Whitney analyses showed no effect of gender upon overall donations for the adult sample as a whole ($U=698.50$, $p=.52$), Chi-square analyses showed no effect of gender upon the decision to donate for the sample as a whole ($\chi^2(1)=0.56$, $p=.48$), Mann-Whitney analyses showed no effect of gender upon overall donations for the sample as a whole ($U=72.50$, $p=1$). Thus, gender did not influence adults' donation profile

3.3.2.2 Sibling status

As it was hypothesised that the influence of the possession of older siblings observed in Chapter 2 may change with time, data were compared in terms of individual sibling groups. Analyses were first conducted in terms of overall donation profile, followed by the decision to donate and size of positive donations.

Kruskal-Wallis analysis revealed no significant differences between the adult sibling groups in terms of overall donations ($H(2)=3.79$, $p=.18$). However, planned comparisons using

Mann-Whitney tests revealed marginal differences between singleton and firstborn adults ($U=141.00$, $p=.10$) and between singleton and lastborn adults ($U=226.00$, $p=.08$), with both firstborn and lastborn adults donating more than singleton adults. No difference was observed between firstborn and lastborn adults ($U=450.00$, $p=.93$); see right hand panel of Figure 3.2.

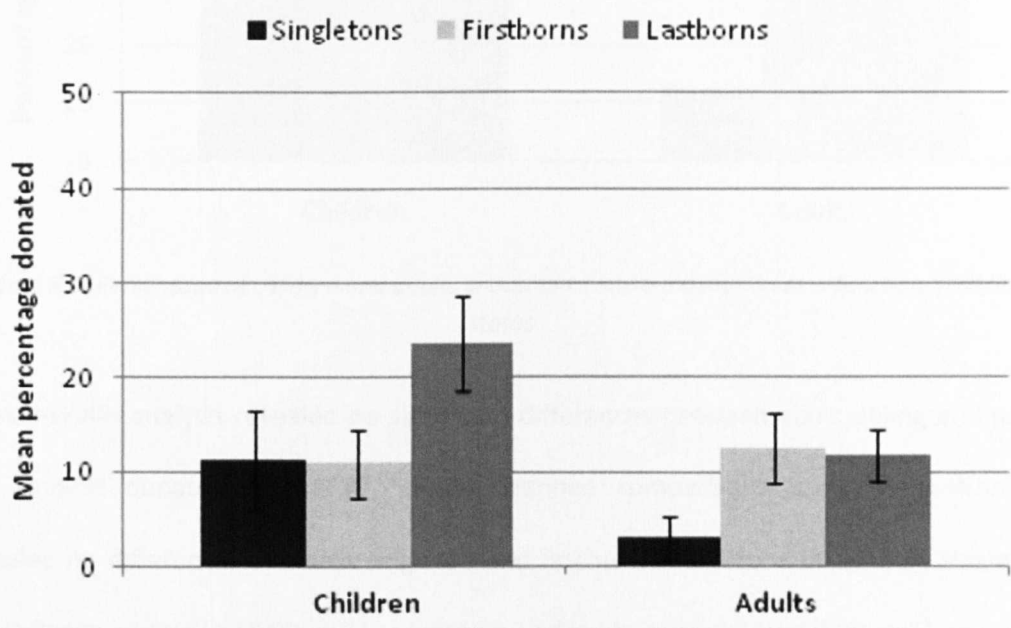


Figure 3.2: Mean overall donations in children and adults as a function of sibling status (error bars represent standard error of the mean)

Chi-square revealed no significant differences in the decision to donate between the adult sibling groups ($\chi^2(2)=3.54$, $p=.20$). Planned comparisons with two-sample z-tests revealed marginal differences between singleton and firstborn adults ($z=1.73$, $p=.08$) and between singleton and lastborn adults ($z=1.79$, $p=.07$), with both firstborn and lastborn adults choosing to donate more often than singleton adults. No significant difference was observed between firstborn and lastborn adults ($z=0.05$, $p=.96$); see right hand panel of Figure 3.3.

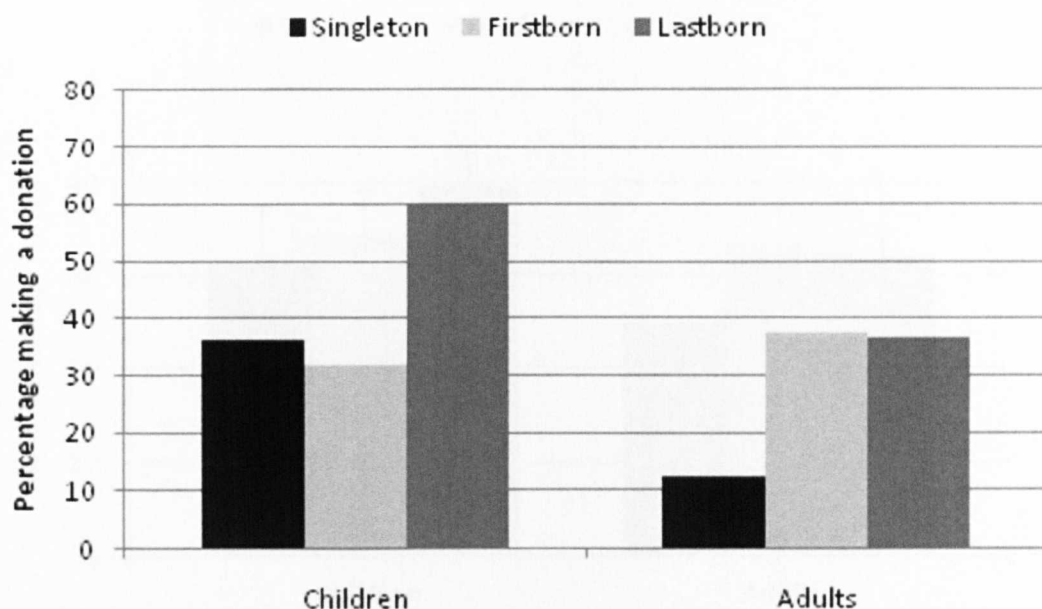


Figure 3.3: Percentage of children and adults choosing to make a donation as a function of sibling status

Kruskal-Wallis analysis revealed no significant differences between adult sibling groups in the amount donated ($H(2)=0.87$, $p=.85$). Planned comparisons using Mann-Whitney revealed no differences between singleton and firstborn adults ($U=6.00$, $p=.56$), singleton and lastborn adults ($U=10.00$, $p=1$) or firstborn and lastborn adults ($U=60.00$, $p=1$); see right hand panel of Figure 3.4.

Thus, both firstborn and lastborn adults donated more overall than singleton adults. This appears to be driven by the decision to donate, as firstborn and lastborn adults chose to donate more often than singleton adults while there were no sibling differences in positive donations.

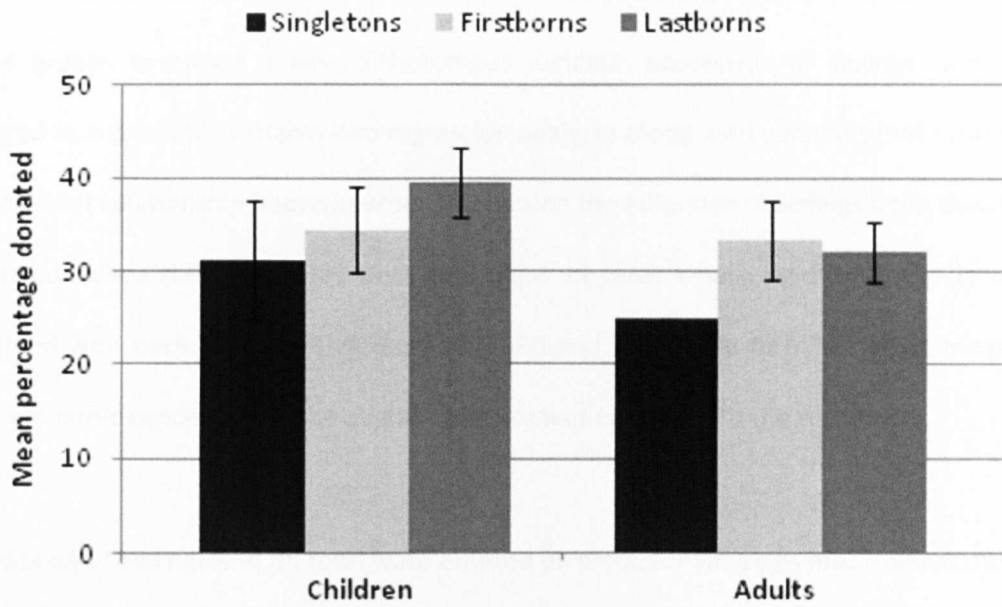


Figure 3.4: Mean positive donations in children and adults as a function of sibling status (error bars represent standard error of the mean)

3.3.2.3 Confounding variables

Correlations were conducted to examine whether any potential confounding variables influenced donation behaviour (see Table 3.6). There was a significant positive relationship between overall donations and empathic concern ($r_s=.32, p=.01$), personal distress ($r_s=.24, p=.04$) and IRI total ($r_s=.29, p=.01$). There was a significant positive relationship between decision to donate and both empathic concern ($r_{pb}=.34, p=.002$) and IRI total ($r_{pb}=.30, p=.01$). No other variables had a significant influence on donation behaviour ($p>.05$).

Table 3.6: Relationships between confounding variables and donations in adults (standard deviations in parentheses)

	Overall donation profile	Decision to donate	Positive donations
Age	$r_s=.07, p=.52$	$r_{pb}=.17, p=.13$	$r_s=-.25, p=.23$
SES	$r_s=-.20, p=.11$	$r_{pb}=-.22, p=.09$	$r_s=-.21, p=.45$
Childcare	$r_{pb}=.08, p=.50$	$\chi^2(1)=0.42, p=.62$	$r_{pb}=.05, p=.83$
Fantasy	$r_s=.16, p=.16$	$r_{pb}=.14, p=.22$	$r_s=.14, p=.50$
Empathic concern	$r_s=.32, p=.01$	$r_{pb}=.34, p=.002$	$r_s=.11, p=.62$
Perspective-taking	$r_s=.19, p=.10$	$r_{pb}=.18, p=.11$	$r_s=-.21, p=.33$
Personal distress	$r_s=.24, p=.04$	$r_{pb}=.19, p=.10$	$r_s=.27, p=.19$
IRI total	$r_s=.29, p=.01$	$r_{pb}=.30, p=.01$	$r_s=.12, p=.56$

As there were no differences between firstborns and lastborns, data were collapsed across these groups to create a new dichotomous variable: possession of siblings. This was entered as a predictor variable into regression analyses along with variables that produced a significant relationship above in order to examine the influence of siblings upon donation behaviour when these variables were controlled. In cases where significant effects were obtained with both an overall measure (e.g. IRI) and a subscale from the same measure (e.g. empathic concern) only the overall measure was entered into the regression.

Possession of siblings and IRI total were entered as predictor variables into a simultaneous multiple regression, with overall donations as the dependent variable. Data were significantly skewed ($z\text{-score}=4.94$) and so the results should be interpreted with caution. A significant model was produced ($F_{2,75}=7.01$, $\Delta R^2=.15$, $p=.002$). Total IRI score emerged as a significant predictor of overall donations, with donations increasing with IRI score. Possession of siblings also significantly predicted donations, with adults with siblings donating more than those without siblings; coefficients are summarised in Table 3.7.

Table 3.7: Summary of multiple regression analysis for variables predicting overall donations in the DG in adults (n=78)

	<i>B (SE)</i>	Significance	95% CI for <i>B</i>
Constant	.096 (0.39)	.02	1.74-0.18
IRI total	0.02 (0.01)	.004	0.01-0.03
Possession of siblings	0.39 (0.17)	.03	0.05-0.73

Possession of siblings was subsequently entered as a predictor variable into a simultaneous logistic regression along with IRI total. The dependent measure was the decision to donate. Data were significantly skewed ($z\text{-score}=2.25$) and so the results should be interpreted with caution. Both IRI total and possession of siblings significantly predicted donation decision,

with between 15% and 21% of the variance being accounted for by the model ($\chi^2(1)=12.63$, $p=.002$); people with siblings and a high IRI score were more likely to donate. Coefficients are summarised in Table 3.8.

Table 3.8: Summary of logistic regression analysis for variables predicting donation decision in the DG in adults (n=78)

	<i>B (SE)</i>	<i>Wald (df)</i>	<i>Significance</i>	<i>Exp b (95% CI)</i>
Constant	-4.69 (1.61)	8.54 (1)	.003	0.01
IRI total	0.06 (0.02)	7.17 (1)	.01	1.06 (1.02-1.11)
Possession of siblings	-1.64 (0.83)	3.88 (1)	.05	0.20 (0.04-0.99)

As no variables significantly predicted positive donations, a regression was not run on this measure.

In sum, in adults the effect of sibling status took the form of an effect of possessing siblings (either older or younger). Furthermore, possessing siblings was a significant predictor even when the effect of empathic concern (a variable which significantly correlated with the donation profile) was partialled out.

3.3.3 Age: adults and children

In order to examine how donations change with age from childhood to adulthood, adults' donations were compared to those of 4-5 year-old children in the 4 condition in Chapter 2 (only those children who completed the 4 condition first were included; see Figure 3.1.). Mann-Whitney analysis revealed a significant difference between adults' and children's overall donation profile ($U=3666.00$, $p=.03$), with children donating more than adults. Chi-square revealed no difference between children and adults in terms of the decision to

donate ($\chi^2(1)=2.65$, $p=.13$); Mann-Whitney analysis showed that children made significantly larger positive donations than adults ($U=421.50$, $p=.01$).

3.3.3.1 Sibling status and age

In order to further examine how the impact of sibling status upon donations changes with age, adults' and children's donations were compared for individual sibling statuses. Analyses were first conducted in terms of overall donation profile, followed by the decision to donate and size of positive donations.

Mann-Whitney analyses revealed no difference between firstborn adults' and children's overall donations ($U=589.50$, $p=.89$). Singleton children donated marginally more than singleton adults ($U=130.00$, $p=.09$) and lastborn children donated significantly more than lastborn adults ($U=513.00$, $p=.01$); see Figure 3.2. Chi-square revealed no differences in the decision to donate for singletons ($\chi^2(1)=2.72$, $p=.14$) or firstborns ($\chi^2(1)=0.09$, $p=.80$) but lastborn children chose to donate significantly more often than lastborn adults ($\chi^2(1)=4.18$, $p=.05$); see Figure 3.3. Mann-Whitney analyses showed no differences in positive donations for singletons ($U=4.00$, $p=.47$) or firstborns ($U=66.00$, $p=.68$), but lastborn children donated significantly more than lastborn adults ($U=97.00$, $p=.02$); see Figure 3.4.

Thus the change in the donation profile of sibling groups across age was driven mainly by lastborn adults being less generous than lastborn children.

3.4 Discussion

The present study sought to establish whether the sibling differences in 4-5 year-olds' altruistic behaviour on the DG observed in Chapter 2 persist into adulthood. It has demonstrated that under conditions of scarcity adults are less altruistic than children and adults' behaviour is influenced by the possession of siblings as well as by empathy traits.

3.4.1 Overall altruistic behaviour in adults

The present study differed from previous instances of the DG in adults in that it made use of a reduced endowment of four £1 coins. Indeed, to date only one similar study has been conducted: participants were given an endowment of \$5 and donations did not differ significantly from those given an endowment of \$10 (Forsythe et al., 1994). However, the present study made use of a double blind procedure and so the current findings are listed with only those of other double blind studies in Table 3.9. As this table shows, the current findings sit comfortably with those of other studies with larger endowments and supports previous findings that participants tend to allocate a fixed proportion of their endowment regardless of its size (Carpenter et al., 2005; Forsythe et al., 1994; Harbaugh & Krause, 2000; List & Cherry, 2008).

While the overall mean sits in the middle of the distribution of means in Table 3.9, in terms of the decision to donate approximately 32% of participants in the current study chose to make a donation, which is at the lower end of the studies listed in Table 3.9. This is most likely due to the lack of variability available with an endowment of four coins – the participant has five possible options available to them compared to the eleven options with an endowment of ten coins. As such, donation of just one coin, which represents 10% of the total in an endowment of ten, represents 25% of the current endowment and is therefore a greater sacrifice for the participant. People who may have given one coin from

a larger endowment may have chosen to keep the entire endowment in the present study, thus decreasing the proportion of participants who chose to make a donation. The fact that the mean given by only those who chose to donate is at the higher end of the spectrum in Table 3.9 supports this idea – participants are not consistently selfish in the present study, but the likelihood of donating nothing is increased. However, it would be a leap to say that those that donate are more generous, as the same lack of variability will inflate the mean positive donation in comparison to those of studies with larger endowments; these opposing effects counteract one another to create an overall mean that is consistent with previous results.

The lack of variability in the present study also appears to have extinguished all donations above 50% (see Figure 3.1), which, while rare, do occur with larger endowments (Camerer, 2003). Indeed, in some cases participants give 100% of their endowment and these outliers can skew results when they are not removed, as Frohlich et al. (2001) demonstrated (see Table 3.9). While removal of outliers is undoubtedly statistically necessary, it also removes interesting data that may give insight into the correlates of highly altruistic behaviour; removal of outliers has not been necessary in the present study and so all participants' responses are represented.

It is possible that the results for the group as a whole may have been influenced by the attempt to balance the sibling groups. This, in combination with the exclusion of middleborns and twins, may have resulted in a different distribution of sibling groups than that observed in the general population, and this should be borne in mind when comparing the present results to other DG studies in adults. Given the consistency of results from the present study with those of previous studies, however, it is unlikely that the

Table 3.9: Donation profiles in double-blind dictator games in adults

Reference Experimental condition	Endowment size	Overall percentage donated (%)	Percentage of participants choosing to donate (%)	Percentage donated by those who chose to donate (%)
Hoffman et al. (1994) Double blind 1 Double blind 2	\$10 \$10	9.17 10.49	36.11 41.46	25.38 25.29
Hoffman et al. (1996) Double blind 1 Double blind 2	\$10 \$10	6.86 8.46	35.33 42.00	20.00 22.00
Johannesson & Persson (2000) Double blind Double blind with randomly drawn recipients from the general population	SEK 100 SEK 100	13.33 8.89	33.33 31.48	39.99 28.24
Frohlich et al. (2001) Manitoba (two room); including outliers Manitoba (two room); two outliers removed	\$10 \$10	27.27 18.18	63.64 60.00	42.86 28.57
Burnham (2003) No photo	\$10	11.90	46.15	25.78
Present study Adult DG	£4	10.26	32.05	32.00

overrepresentation of some sibling groups and underrepresentation of others had a significant effect upon findings.

The results of the current study were compared to those children in Chapter 2 who received the 4 condition first. This is the first time that adults and children's DG behaviour has been directly compared using a comparable measure and children were found to donate more than adults on all measures – the overall donation profile, the decision to donate and positive donations. This implies that findings of higher level of altruism in young children than that typically observed in adults (Gummerum et al., 2010; Lucas et al., 2008) are not merely a factor of differences in methodology, but in fact reflect a genuine decrease in adults' altruistic behaviour. However, comparison of behaviour of adults and young children does not allow inference of the trajectory in between these points of assessment and the function may not be linear. DG studies in young children have previously found an increase in altruistic behaviour across the primary years (Benenson et al., 2007; Gummerum et al., 2010), although other studies with large age ranges have found no impact of age upon donations (Gummerum et al., 2008; Harbaugh et al., 2003). Longitudinal study is necessary in order to properly examine how altruistic behaviour changes with age.

3.4.2 Confounding variables in adults

Gender did not have a direct impact upon donations in the present study: there was no difference between the donations of men and women. While it is not unusual to find a null effect of gender in the DG (Ackert et al., 2009; Bolton & Katok, 1995), it is possible that potential gender differences were masked due to the lack of variability in the response options, with women (who are generally found to be more altruistic when a gender effect is found) donating less often in the current study due to the increased cost of giving.

However, this is unlikely as women have been found to be the more generous group when altruism is expensive (Andreoni & Vesterlund, 2001).

There was a positive relationship between IRI score and both overall donations and the decision to donate, which emerged from the regressions as a more significant predictor than sibling status: as empathic ability increased so did overall donations, while those who chose to donate had a higher IRI score. This supports Batson's empathy-altruism hypothesis, that empathic concern can initiate altruistic behaviour (Batson & Shaw, 1991). Indeed, use of the DG provides additional credibility to this finding given that selfish concerns such as oneness should not be elicited by the DG (an assumption confirmed by the lack of a relationship between DG behaviour and perspective-taking, which mediates the sense of shared identity involved in oneness; Davis et al., 1996), suggesting that empathy can be related to altruism independently of oneness. Moreover, although both empathic concern and personal distress significantly correlated with altruistic behaviour in the DG, when these were entered into the regressions instead of IRI, empathic concern emerged as a significant predictor while personal distress did not, suggesting that the influence of personal distress on altruistic behaviour is mediated by empathic concern. Nonetheless, personal distress cannot be directly elicited by the DG as there is no observable distress to elicit anxiety in the participant.

There was no effect of IRI upon positive donations (where a relationship was observed with children's ToM ability in Chapter 2), nor was there any effect of perspective-taking upon altruistic behaviour in adults. It appears that while the size of children's positive donations depends upon their ability to take advantage of the anonymity in the DG and anticipate the consequences for themselves, the size of positive donations is less reliant on these cognitive factors in adults. While perspective-taking ability does vary in adults, they appear

to have passed a threshold beyond which it no longer influences their altruistic behaviour. It remains unclear what is driving the size of positive donations in adults. Altruistic propensity is the most likely influence, as this is a personality variable rather than a factor that requires cognitive considerations, but further investigation is required to confirm this.

There was not a significant relationship between SES and DG behaviour in the present study. However, a marginal relationship was observed with the decision to donate, with those that chose to donate having a lower SES. Furthermore, the nonsignificant correlations with overall donations and positive donations were also negative: it appears that those who donate more tend to have a lower SES, consistent with the findings of Chapter 2. This is also consistent with Carpenter et al. (2005), who observed a 9% reduction in DG allocations with every standard deviation increase in family income (a proxy for SES), and with the findings of Kameda et al. (2005), who found that low SES students were more likely to endorse a norm based on equity for all rather than one based on merit. It is possible that a stronger, significant, effect of SES would have been observed with a larger endowment or more response options, although no such relationship was observed in the 10 condition of chapter 2. While there were no differences in SES according to sibling status (see Table 3.2), it is interesting to note that singletons had the lowest mean SES yet they also donated the least, the opposite pattern to that observed in the group as a whole. SES is clearly not driving the decrease in donations by singletons; indeed whatever is driving the behaviour in singletons, it is overriding the influence of SES.

3.4.3 Sibling status

The current study has demonstrated that with a restricted endowment of £4, adults show an effect of sibling status upon altruistic behaviour. Contrary to expectations, both firstborns and lastborns, who did not differ in their donations, donated more overall than

singletons; this appears to be driven by the decision to donate, with both firstborns and lastborns choosing to donate more often than singletons. Regression analyses reveal that even when confounding variables such as IRI score are controlled possession of siblings has a significant effect on overall donations and the decision to donate (see section 3.4.2 for discussion of the influence of IRI score). Positive donations, however, did not differ in terms of sibling status (or for any other variable measured), supporting the idea that siblings influence the norms governing whether or not to give, but how much is given once that decision has been made is down to individual altruistic propensity (see section 2.4.2; Saunders & Lynn, 2010). It would be informative to conduct a DG alongside collection of questionnaire data on altruistic propensity in order to further examine this hypothesis.

The lack of a difference between firstborns and lastborns in the present study demonstrates that the reduced altruism observed in firstborns relative to lastborns in Chapter 2 is not a permanent state of affairs. Indeed, as Figure 3.2 demonstrates, firstborns do not appear to catch up with lastborns in adulthood, but rather lastborns decrease their donations to fall in line with those of firstborns. Furthermore, singletons' donations also decrease from childhood into adulthood (although the effect was only marginally significant). As adults give less than children, it seems that young children are overly generous in the DG. When adults' and children's DG behaviour is compared for individual siblings statuses, it appears that lastborns and singletons are reducing their donations in adulthood, while firstborns remain consistent. If lastborns do internalise the altruistic norm earlier than firstborns and singletons, as suggested in Chapter 2, it may be that application of the norm so young carries with it a greater risk of error, while acquisition at an older age (i.e. firstborns) brings a superior understanding, making behaviour more stable with time.

The small reduction of donations in adult singletons is harder to explain. It is possible that many singletons have acquired the altruistic norm as a social norm but not a personal norm; that is they do not act upon the norm in the absence of external pressure to do so. As such, should singleton children not fully appreciate the anonymity of the DG situation they may implement the altruistic social norm as if they were being observed and donate some stickers. By adulthood, singletons would understand the anonymity of the DG but they may still not have internalised the altruistic norm and so would not implement it in anonymous conditions, causing a drop in donations. Reducing the anonymity of the DG and examining how behaviour changes according to sibling status would help to clarify this issue. While altruistic behaviour would undoubtedly increase due to social desirability being an issue in non-anonymous conditions, it would be likely to do so across the board. However, if a lack of a personal altruistic norm were driving singletons' behaviour it would be expected to increase further to mirror that of adults with siblings.

The finding that singletons exhibited different behaviour than people with siblings is inconsistent with a number of previous studies, who have found the personalities and prosocial behaviour of people with and without siblings' to be comparable (Kwan & Ip, 2009; Riggio, 1999; Polit & Falbo, 1987). However, these studies have relied on self-report and consequently are more open to the effects of social desirability than the present study. As discussed above, singletons may decrease their altruistic responses to a greater degree than people with siblings under conditions of anonymity. Moreover, personality differences according to sibling status depend upon the source of the rating and do not necessarily emerge with self-report (Jefferson et al., 1998).

The current finding that the influence of sibling status changes from the possession of older siblings to the possession of siblings in general is also unexpected. In light of the personality

literature (e.g. Jefferson et al., 1998; Michalski & Shackelford, 2002; Paulhus et al., 1999) and the findings of Van Lange et al. (1997) firstborns were expected to be less altruistic than lastborns. The reduced endowment size in the present study, while emphasising individual differences in children, may have masked them in adults and differences between firstborns and lastborns may emerge with the greater variability provided by a larger endowment. Given that firstborns do not increase their donations to fall in line with lastborns, but rather lastborns decrease their donations to the level of firstborns, it is possible that as discussed above, lastborns who would have donated when the cost of giving was not so high kept the endowment for themselves. Further study with a standard endowment is required to confirm whether the influence of siblings truly shifts in adulthood.

Sibling effects are more likely to be found in within-family analyses as these tend to exaggerate differences by making direct comparisons with specific individuals (Sulloway, 1996); however, finding a sibling effect in between-family analyses in the present study demonstrates that sibling status is capable of exerting an influence on an individual's behaviour out of the family context in adulthood. This effect appears to be driven specifically by siblings rather than the increased socialisation associated with living with other individuals as neither adults nor children exhibited a relationship between time spent with peers and altruistic behaviour. As such, spending time with peers does not seem to help singletons to compensate for the sibling interactions they are missing. However, the measure may not have captured potential differences attributable to peers – it is possible that there is a critical period where peers are particularly influential but the measure would have missed this as it assessed time spent with peers across the entirety of childhood.

3.4.4 Mechanisms of sibling influence

Assessing the influence of sibling status in adults allows extension of the assessment of the mechanisms which may be driving sibling effects upon altruistic behaviour described in section 2.4.4. The data from the current study are inconsistent with the following mechanisms (see Table 3.1): differences in parental investment, dominance hierarchy effects, niche partitioning and deidentification. The differences in parental investment mechanism predicts a decline in outcome the later in the constellation the child is born, with singletons having the best outcome. However, although adults have had ample time for inequality to accumulate between siblings, which was not the case with children (whose behaviour was also inconsistent with this mechanism), the predicted pattern did not emerge. As both adults and children did not behave in keeping with the predictions of this mechanism, it can safely be ruled out as contributing to differences in altruistic behaviour according to sibling status in the present study. Similarly, data from both adults and children were inconsistent with the dominance hierarchy effects mechanism. Lastborns, according to the predictions of this mechanism, were expected to be the most altruistic in order to compensate for their lack of power, while firstborns were expected to be the least altruistic; this difference would be stable over time. While lastborn children were more altruistic than firstborns, in adults there were no differences between these groups and this mechanism can also therefore be ruled out as driving behaviour in the present study. Niche partitioning predicted that lastborns would differ from both singletons and firstborns in their altruistic behaviour due to them seeking to distinguish themselves by increasing their generosity. While this mechanism was supported by the data from Chapter 2, findings from the present study are not consistent as lastborns decreased their altruistic behaviour in adulthood, behaving comparably to firstborns. Equally, deidentification predicted that firstborns and lastborns would differ as they sought to establish their own, unique personalities. While the data from the present study were inconsistent with this

mechanism, data from Chapter 2 were consistent with the deidentification hypothesis. While it was expected that differences due to this mechanism would increase in adults as people established themselves as different from their siblings, it is possible that some people in the present study increased their generosity while others decreased their generosity with the net result being no difference between the groups. It is difficult to accept that someone would be selfish merely to mark themselves apart from their siblings; nonetheless, this mechanism cannot be ruled out based upon the findings from the current study and those of Chapter 2.

Data from the present experiment are consistent with the following mechanisms from Table 3.1: birth order stereotypes, teaching and modelling; these mechanisms are also consistent with the results from Chapter 2. Singletons being less altruistic than people with siblings in the present study is consistent with the birth order stereotype that singletons are selfish. Should stereotypes be driving altruistic behaviour, it is possible that the firstborns in Chapter 2, who behaved comparably to singletons, did not yet have enough experience with their siblings for the singleton stereotype to have ceased having an influence on their behaviour. It seems unlikely that singletons would suppress the altruistic urge merely to conform to a stereotype, especially when a negative reputation would surely ensue in real-world encounters. In addition, it is unnecessary to conform to a stereotype in anonymous conditions, implying that should singletons' behaviour be driven by stereotypes they have been internalised even by 4-5 years of age. However, the fact that singletons' altruistic behaviour decreases in adulthood is consistent with stereotypes being increasingly internalised into adulthood. Thus, the influence of stereotypes upon altruistic behaviour cannot be ruled out based on the current findings. It must be noted, however, that it is plausible that stereotypes arise because they reflect real-world differences rather than the differences arising because the stereotypes exist.

Both teaching and behavioural modelling mechanisms predicted that while firstborn children would be less generous than lastborn children, this difference would disappear with age as firstborns' experience with their younger siblings increased. This is consistent with the present findings, as is the prediction that singletons would be the least generous as they do not have siblings to act as teachers or models. It is not possible to distinguish between these mechanisms based upon the current findings, nor is it clear how exactly these mechanisms exert their influence. Given that firstborns' behaviour does not change with age, it seems that interactions with younger siblings are sufficient to maintain that level of altruistic behaviour, unlike singletons who have no such interactions and whose altruistic behaviour decreases with age. It may be the act of teaching/modelling that maintains firstborns' level of altruism; conversely they may follow the example of their younger siblings although given that they do not increase their altruistic behaviour to match that of lastborns this is less likely. Indeed, lastborns' altruistic behaviour decreases with age to match that of firstborns. This may be due to their older siblings teaching or showing them that their behaviour was unnecessarily generous and that it is socially acceptable to be less so, a behaviour that is then generalised to the anonymous conditions of the DG.

It is likely that rather than only one mechanism driving differences in altruistic behaviour, there are multiple mechanisms interacting and different children may adopt different strategies depending upon their relationship with their siblings (Whiteman et al., 2007a, 2007b). It is possible that different mechanisms contribute at different points in life: stereotypes for instance may not have a strong impact upon children's behaviour but their influence may increase with age, while teaching and modelling may be less necessary as a child grows up. While the results of the present study can shed light on the mechanisms

that may drive sibling differences, only direct assessment of these mechanisms can reliably confirm the current conclusions. It would also be informative to repeat the study with a larger endowment in order to ensure that the lack of variability in the present study is not masking potential differences, which would potentially support different mechanisms of sibling influence. However, based upon the current findings, a combination of teaching, modelling and stereotypes appear to be driving the influence of siblings upon altruistic behaviour.

The present study has demonstrated that differences in altruistic behaviour according to sibling status can arise in adults' DG performance, even when individual differences in empathy are controlled. This highlights the necessity for studies of altruism to record participants' sibling status, as differing ratios of sibling groups may contribute to the heterogeneity observed across studies. Furthermore, the influence of sibling status changes over time with older siblings benefiting children while siblings in general benefit adults. However, in addition to individual differences there are also a number of situational factors that can influence DG behaviour, such as the source of the endowment and the characteristics of the recipient. The following chapters will examine how these factors influence the altruistic behaviour of 4-5 year-olds and whether sibling groups are differentially affected.

Chapter 4: The influence of earning the DG endowment in preschool children

4.1 Introduction

While previous chapters have focussed on how the characteristics of the allocator in the DG influence their donations, the current chapter will examine how the characteristics of the endowment itself influence how it is allocated. Adults who have earned their endowment tend to donate less of it to the recipient than when they have not worked for it. The present chapter will examine whether this earning effect can also be observed in 4-5 year-old children who have had to work for their stickers.

4.1.1 Windfall and earned resources

The economic principle of fungibility states that all money of the same currency is freely interchangeable, with one monetary unit possessing equal value to any other. However, despite fungibility being a core principle of normative economic theory, windfall gains are often treated differently than earned resources. A windfall is the acquisition of a resource that is unearned and often unexpected, such as a lottery win, inheritance or even finding money in the street and windfall money is more likely to be spent than earned money (Arkes et al., 1994; Cattellino, 2009; Thaler, 1999). This has been demonstrated by Arkes et al. (1994), who presented participants with questionnaires about the likelihood of spending money that has been acquired by being earned or by a windfall. Participants were more likely to report that they would spend windfall money than earned money, a finding that was confirmed with follow-up studies using real money. Furthermore, manipulation of the sources of both earned and windfall money revealed that the effort invested in acquiring the money did not influence an individual's propensity to spend it; rather it was the anticipation of the money that mattered – unanticipated money was more likely to be spent than anticipated money. In a similar, more recent study, Kameda, Takezawa, Tindale and Smith (2002) found both Japanese and Americans to be more likely to share an

endowment when it has been obtained under uncertain rather than certain conditions, although Japanese participants shared to a greater extent. Contrary to the fungibility principle, it seems that “the history of the dollar seems to influence subjects’ willingness to part with it” (Arkes et al., 1994, p. 347): earned money is not freely interchangeable with unearned money.

Arkes et al. (1994) suggest that the earning effect may occur because people compartmentalise their assets, a process Thaler (1999) calls *mental accounting*. Mental accounting involves mentally dividing resources into different ‘accounts’ according to how it is to be spent, such as budgeting one sum for household bills and another for entertainment. Assets in these accounts are not freely interchangeable and thus also violate the principle of fungibility. Arkes et al. propose that windfall wealth is either allocated to a ‘frivolous’ account or may not even have time to be allocated to an account at all and is therefore more likely to be spent than money that has been allocated to more mundane, necessary accounts.

4.1.2 Earning and the DG

In the DG the endowment is usually separate from the inconvenience allowance given to a participant for their participation and its receipt is generally unexpected and unearned by the participant. As such, these endowments can be viewed as windfalls and findings suggest that they are also treated differently than when the same sums are earned by participants. Hoffman et al. (1994) conducted a treatment in which participants in the DG were required to earn the right to be the first mover (i.e. be the dictator and divide the endowment rather than the recipient and simply accept the division given to them) by scoring in the top 50% of participants in a current events quiz; allocations were lower in this treatment than in the standard DG. Cherry and colleagues have confirmed this finding in numerous DG studies in which participants earn their endowment; they are both less likely to donate and give less

when they do so (Cherry, 2001; Cherry et al., 2002; List & Cherry, 2008). Cherry argues that participants that have earned the money to be allocated have a more legitimate right to that money than those that simply have it bestowed upon them and therefore are less likely to share it with the recipient. Similarly, Carlsson et al. (2010) found that participants who had spent 20 minutes filling in a survey to earn their endowment allocated more to charity than those who had not. Furthermore, when participants were compared on the basis of gender, women donated slightly more on average in the windfall treatment and slightly less in the earned treatment; however these differences were not significant.

The influence of the legitimacy of the assets is so strong that it influences how participants treat others' wealth as well as their own. Oxoby and Spraggon (2008) gave the receiver in the DG the opportunity to earn the endowment that the dictator will divide by answering quiz questions. They provided one of three reward levels dependent upon performance, with it being possible to have answered no questions correctly to receive the lowest reward level. Dictators gave significantly more to receivers who had earned the middle and high reward levels than those who had acquired the same sum in the baseline treatment. However, there was no difference in donations between the baseline and those who earned the lowest reward level, as it was impossible to ascertain the receiver's entitlement to the endowment as they could conceivably have not exerted any effort and not answered any questions but still receive the sum. Similarly, Ruffle (1998) found that when the receiver took part in a quiz to decide how much the allocator would divide, with the top-scoring 50% being given \$10 and the rest \$4, those in the \$10 treatment were offered significantly more than those in the baseline treatment who acquired the same sum by chance. List (2007), on the other hand, asked all participants, both dictator and recipient, to stuff envelopes for 30 minutes to earn the endowment and gave the dictator the opportunity to not only donate up to \$5 to the recipient, but also the option to take \$1

from the recipient. When the endowments were earned both giving and taking were reduced compared to the baseline treatment, with the majority of dictators choosing to give and take nothing, possibly due to the greater moral cost of taking earned wealth (List, 2007). These studies confirm that earned wealth is treated differently than windfall wealth along a variety of dimensions; however, the influence of the source of a resource is not limited to economic games.

Anthropological studies of hunter-gatherers such as the Ache in Paraguay reveal that hunted game is more likely to be distributed throughout the community than collected resources. This strategy is thought to collectively reduce risk as (similar to a windfall) the acquisition of meat is more uncertain and susceptible to failure than that of foraged fruit and vegetables (Kaplan & Hill, 1985). Work with the Hadza of Tanzania, on the other hand, suggests that sharing meat is a means of reputation enhancement rather than risk reduction (Hawkes, O'Connell, & Blurton Jones, 2001). While it seems plausible that a similar process is governing this sharing behaviour and that observed in the DG, (Gurven & Winking, 2008) found no relationship between standard DG performance and food sharing in the Tsimane of Bolivia. However, whilst the caloric load of shared food was factored into the analysis, a distinction was not drawn between hunted meat and harvested foods and this combined with a sample of only 14 participants may have contributed to the null result.

4.1.3 Influence of earning in children

While it is widely accepted that requiring adults to earn their DG endowment reduces donations, this has never been directly examined in children. However, there is evidence to suggest that children would also modulate their DG donations according to whether or not it was earned. Staub and Noerenberg (1981) asked 8-10 year-old boys to play a bowling game and subsequently gave them candy as either an expected reward or an unexpected windfall. These children were allowed to eat their candy immediately but were not allowed

to take it with them when they returned to the classroom. Shortly afterwards, another child was introduced to the room and the pair were left alone to listen to a story, giving the original child the opportunity to eat or share his candy. Boys who believed that they had earned their candy ate significantly more of it than those who did not; they also ate more relative to what they shared than did those who did not earn the candy. The authors suggest that the children are adhering to a 'norm of deserving' (hereafter *legitimacy norm*⁸) in which it is acceptable to keep more of a resource for oneself when it has been earned. Conversely, Willis, Feldman and Ruble (1977) found that when 5-9 year-old children were presented with an unexpected monetary windfall or an earned, expected sum and given the opportunity to give some of this money to charity, donations did not vary as a function of earning at any age.

Previous work has also examined how a child's entitlement to their reward affects how they share it, i.e. how the legitimacy of the assets influences sharing. Long and Lerner (1974) paid 9-10 year-olds to 'market test' a toy and told them either that they had been given an appropriate amount or that they had been overpaid, thus decreasing their sense of entitlement to the reward. When given the opportunity to donate some of their earnings to charity, those children who had been overpaid donated more. Similarly, Staub (1971) rewarded 9-11 year-old boys with candy for their participation in a bowling task. These children were informed that they had been successful at the task, performed at an average level, or that they had failed at the task (all children were nonetheless given the same amount) and their willingness to share with an absent child was assessed. They found that younger children in the successful group shared less than those in the intermediate and failure groups, while older children in the successful group shared the more than those in

⁸ In order to avoid confusion with Chapter 5, in which the influence of the deservingness of the recipient upon DG behaviour is assessed, the 'deserving norm' will hereafter be referred to as the 'legitimacy norm'.

the intermediate and failure groups. They suggest that should a legitimacy norm influence behaviour, then it no longer applies by 11 years of age.

4.1.4 Present study

Findings on the influence of earning and the legitimacy of assets in children are clearly mixed. The present study aimed to ascertain whether 4-5 year-olds modulated their donations on the DG according to whether or not the endowment was earned, allowing exploration of whether a legitimacy norm has yet been acquired at this young age. Children were asked to spend 15 minutes completing a series of maths and theory of mind tasks in order to earn their endowment of stickers and then took part in the DG with their earned stickers. Donations were then compared to those from Chapter 2 in which the DG was conducted before the maths and ToM tasks, with the stickers given as a windfall.

Four to five years is a much younger age group than has generally been used to investigate the earning effect, but the evidence in adults and older children suggests that young children may donate less when they have earned their endowment than when they have acquired it as a windfall; however, this may not be the case as the single study that has used a young age group has found no earning effect (Willis et al., 1977). Given that many of the previous studies in children have used only boys, the present study will also investigate the impact of gender upon the earning effect, however, given the lack of a gender effect in Chapter 2 and the lack of gender differences in adults (Carlsson et al., 2010), gender differences are not expected. Finally, given the findings of Chapter 2, the influence of possessing older siblings upon the earning effect will be assessed. Children with older siblings donated more in the Classic DG and so it is likely that they will show a greater drop in donations when the endowment is earned than those without older siblings.

4.2 Methods

4.2.1 Participants

Fifty-six 4-5 year-old children (mean age 4:11; age range 4:0 to 5:10) participated in the study. Four children were recruited from the Human Development and Learning database and were tested in the School of Psychology, University of Nottingham. Eight children were recruited from local Nottingham schools and were tested in a quiet environment in their school setting. The remaining 44 children were recruited from the University of Nottingham Summer Scientist week, a week-long event during which parents can bring their children along to a morning or afternoon session to participate in a variety of psychology experiments. Children were tested in a quiet area away from other children. At the time of consent parents completed a questionnaire detailing demographic information such as their child's age, gender, the number and ages of the child's siblings and the average time the child spends in childcare and extracurricular activities per week (see Appendix 1). Children were recruited on the basis of sibling status to fall into the following groups: singletons (no siblings), firstborns (only younger siblings) and lastborns (only older siblings). In order to ascertain whether children who had earned their endowments modulated their donations accordingly, data were compared to those from the 10 condition in Chapter 2 (hereafter the Classic DG). Only those who received the 10 condition first were included and groups were balanced on size, age, gender and sibling composition; see Table 4.1 for sample characteristics for the group as a whole. See Table 4.2 for sample characteristics for the Earning DG by sibling status.

Table 4.1: Descriptive statistics in the Earning DG and the Classic DG (standard deviations in parentheses; ranges in italics)

	Earning DG	Classic DG	Group differences
Total n	56	56	
Gender (female:male)	29:27	28:28	
Siblings (singletons:firstborns:lastborns)	11:24:21	11:25:20	
Age/months (mean)	59.05 (6.11) <i>48-70</i>	59.41 (6.00) <i>49-72</i>	$U=1533.00, p=.84$
Time spent with unrelated peers (mean hours/week)	27.49 (10.80) <i>3.00-45.83</i>	30.02 (10.85) <i>3.00-45.75</i>	$U=1371.00, p=.25$
SES (mean percentile)	66.78 (22.05) <i>5.76-95.63</i>	74.20 (25.79) <i>12.09-99.53</i>	$U=1019.50, p=.03$

Table 4.2: Descriptive statistics across sibling groups for the Earning DG (standard deviations in parentheses; ranges in italics)

	Singletons	Firstborns	Lastborns	Group differences
Total n	11	24	21	
Gender (female:male)	3:8	14:10	12:9	
Age/months (mean)	58.45 (4.41) <i>50-67</i>	59.00 (6.81) <i>48-70</i>	59.43 (6.25) <i>49-69</i>	$H(2)=0.15, p=.92$
Time spent with unrelated peers (mean hours/week)	23.73 (12.71) <i>3.00-41.00</i>	29.11 (9.89) <i>11.00-44.50</i>	27.60 (10.79) <i>12.00-45.83</i>	$H(2)=1.98, p=.37$
SES (mean percentile)	65.28 (30.96) <i>22.92-95.63</i>	67.52 (20.61) <i>5.76-95.46</i>	66.62 (19.87) <i>34.89-94.59</i>	$H(2)=0.15, p=.93$

4.2.2 Procedure

In the Earning DG, each child first participated in an earning phase followed by one iteration of the DG with 10 stickers. Children were given 10 stickers in order to provide sufficient variability in donations to be able to capture differences according to whether or not the endowment was earned. The earning phase entailed completion of a series of tasks

(measures of mathematical ability and ToM ability) in order for the child to earn her endowment of 10 stickers. All children spent approximately 15 minutes earning their stickers. In the Classic DG each child was first given her endowment and offered the opportunity to share it in the DG and subsequently completed measures of mathematical ability and ToM ability; for the full procedure of the Classic DG see section 2.2.2.

4.2.2.1 *Earning phase*

The child was informed that the experimenter would like her to complete a series of tasks and if she worked hard and completed them all she would be allowed to choose some stickers. It was emphasised once during completion of these tasks that the child was working very hard and should she continue to do so she would receive her stickers. It was not implied that receipt of the stickers was contingent on the child's performance, simply that she needed to work hard, and all children were allowed to choose their stickers irrespective of their success at the tasks. The tasks in the earning phase were modelled closely on the measures used to measure mathematical ability and ToM ability in Chapter 2.

The child began with the *division task*, dividing blocks into two equal piles as in the *equal division task* in Chapter 2: first four blocks and then ten blocks. Additional divisions were then added: nine blocks divided into three equal piles (a ratio of 1:1:1); nine blocks divided into two piles in a ratio of 2:1; ten blocks divided into two piles in a ratio of 4:1; and ten blocks divided into two piles in a ratio of 3:2. Three trials were conducted for each division and the task was intended to be of increasing difficulty, both so that the child had to work increasingly hard and so that the task could be discontinued should the child be unable to complete it. If this was the case, the child was allowed to attempt the task for several minutes before moving on to the next set of tasks to ensure that she was working for a comparable amount of time as the other children. The divisions that were introduced for

the current experiment were described to the child as following a rule, such as “each time you put one block on the red mat I’d like you to put two blocks onto the blue mat”. Each time the ‘rule’ changed the child was shown an example with a small number of blocks to ensure her understanding of the rule.

Once the child had divided all of the blocks she was then presented with a modified version of the *same/more task* from Chapter 2 in which the child was shown pairs of cards depicting various numerosities with coloured spots and asked whether both cards depicted the same numerosity. If the child answered ‘no’ she was asked which card depicted the larger numerosity, whether or not the pair actually differed. As in the original task, each pair always totalled four or ten. However, in the present experiment, additional pairs totalling ten were added, once again to make the task more difficult and effortful for the child. As such, in addition to receiving pairs of 2:2, 1:3, 5:5 and 8:2, the child also received pairs of 7:3 and 6:4. The ratio is closer for the latter pairs, meaning that the child would most likely need to count the spots to be able to ascertain whether or not they were the same as these ratios lie outside the limits of subitizing. In all cases the child was presented with a linear arrangement as this is how the stickers were presented in the DG and the random arrangement would be likely to make the task too difficult. The order in which the pairs were received was pseudorandomised, with no more than three trials in a row requiring the same response to avoid perseveration on the same response. As there were three trials for each pair, the side on which each numerosity appeared was fully counterbalanced across every two participants to avoid a bias towards one visual hemisphere. The number of correct responses on each of the tasks above was summed to give a composite maths score with a maximum score of 39.

Upon completion of the maths tasks above, the child was presented with the ToM tasks used in Chapter 2: the *deceptive box task*, based on Gopnik and Astington's (Gopnik & Astington, 1988) Smarties task and a pictorial adaptation of Baron-Cohen et al's (Baron-Cohen et al., 1985) *Sally/Anne task*. Scores were summed to give a composite ToM score, with a maximum possible score of 2 (see Chapter 2 for full details of the procedure and scoring).

4.2.2.2 DG

Upon completion of both the maths tasks and the ToM tasks the child was allowed to choose her favourite 10 stickers from a selection of 30. As in the Classic DG, the child chose her favourite sticker from the selection and placed it upon an array with 10 slots, repeating this process until all of the slots were filled. The remaining stickers were then removed from sight. The DG procedure was identical to that in the Classic DG: once the participant had made her selection she was informed that the stickers were hers to keep, but if she wished she could give some of her stickers to another child that had none. The participant was given no other information about the other child and it was stressed that her choice would be completely anonymous and that she was not obliged to give any away at all if she did not wish to, although it was emphasised that the child had worked very hard for her stickers. The experimenter presented the child with two envelopes, one for the participant and one for the other child. The participant's name was written on her envelope and she was asked to divide the stickers between the envelopes as she saw fit. To maintain anonymity, the experimenter and any parents present covered their eyes during this division. Once again, each envelope contained a colouring picture so that no child would receive an empty envelope, limiting the likelihood that the participant felt obliged to donate through guilt avoidance. Once the child had made her division the stickers were sealed into the envelopes and the envelope for the other child was posted into a red post

box. This action completed the study and the child was then free to leave. Once the study was complete the experimenter opened the envelopes and recorded the contents before the stickers were returned to a pool to be distributed amongst future participants.

4.3 Results

Data were examined for skewness and kurtosis. As data were not normally distributed, non-parametric statistics were employed. An alpha level of .05 was used for all statistical tests. In order to be conservative in the analyses, all tests were two-tailed. Data were first examined in terms of the *overall donation profile* (i.e. the proportion of their stickers donated by each child). This was then broken down into analyses of the *decision to donate* (i.e. donating nothing or donating one or more stickers) and *positive donations* (the proportion of stickers donated by only those who chose to donate).

4.3.1 Classic DG

In order to later directly compare data from the Earning DG with data from Chapter 2, only those children who received the 10 condition first (hereafter referred to as the Classic DG) were included; as such results were first reanalysed for only those children. Consistent with findings in Chapter 2, the modal offer in the Classic DG was zero, while when only positive donations were taken into account the modal offer was four stickers. See Table 4.3 for mean donations; Figure 4.1 shows the distributions of donations.

Table 4.3: Mean proportion of endowment donated in the Earning DG and the Classic DG (standard deviations in parentheses)

	Earning DG	Classic DG
Overall donation	12.50 (19.09)	13.75 (18.64)
Decision to donate: proportion choosing to donate	37.50	39.29
Positive donations	33.33 (16.53)	35.00 (11.44)

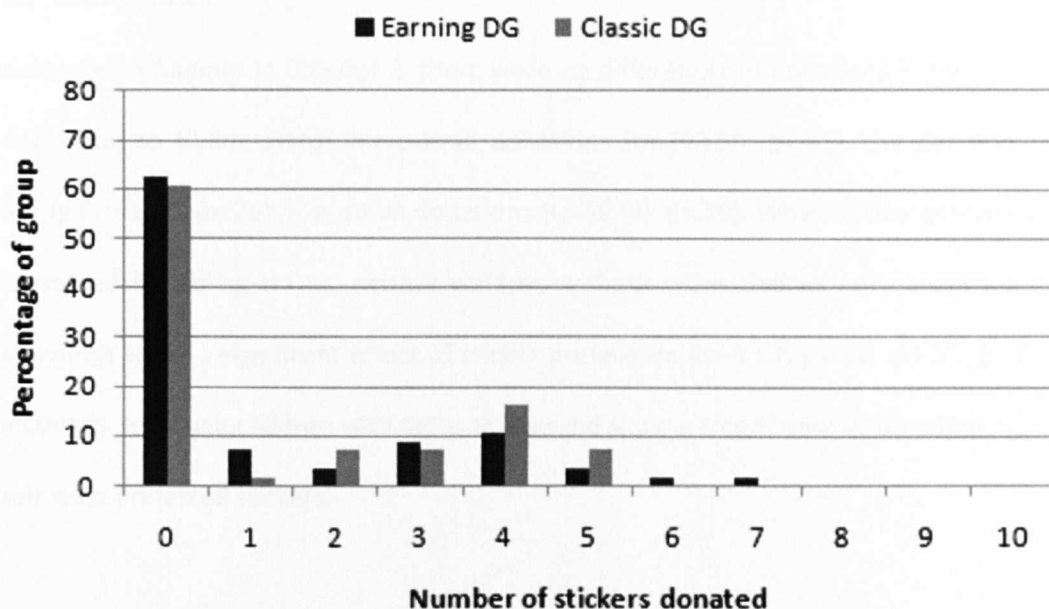


Figure 4.1: Donation distributions in the Earning DG and the Classic DG

As in section 2.3.3, the first 50% of stickers chosen were coded as most preferred and the final 50% chosen were coded as least preferred. The proportion of stickers donated that were most and least preferred were calculated and Wilcoxon analyses show that unlike in Chapter 2 (where there was no effect of sticker preference in the 10 condition) children in the Classic DG donated significantly more of their least-preferred stickers ($z = -2.49$, $p = .01$).

4.3.1.1 Gender

Consistent with the trend observed in Chapter 2, in the Classic DG girls made larger overall donations than boys ($U = 2740.00$, $p = .03$) and chose to donate more often than boys ($\chi^2(1) = 4.79$, $p = .05$); however, girls and boys did not differ in the size of their positive donations ($U = 46.50$, $p = .66$). Consistent with Chapter 2, when sticker preference was assessed by gender, neither boys nor girls showed a significant effect of sticker preference ($z = -2.00$, $p = .13$; $z = -1.61$, $p = .12$, respectively).

4.3.1.2 Sibling status

Consistent with findings in Chapter 2, there were no differences in donations in the Classic DG according to sibling status for overall donations ($U=296.00$, $p=.21$), the decision to donate ($\chi^2(1)=1.50$, $p=.26$) or positive donations ($U=56.00$, $p=.78$). When sticker preference was assessed by sibling status, neither children without older siblings nor children with older siblings show a significant effect of sticker preference ($z=-1.57$, $p=.14$; $z=1.83$, $p=.09$, respectively), although children with older siblings did show a trend towards donating more of their least preferred stickers.

4.3.2 Earning DG

4.3.2.1 Prosocial behaviour

In the Earning DG the modal offer was zero, while when only positive donations are taken into account the modal offer was four stickers. See Table 4.3 for mean donations; Figure 4.1 shows the distributions of donations.

The impact of sticker preference upon children's donation behaviour when stickers were earned was also assessed. Wilcoxon analyses revealed no difference in donations in the Earning group according to sticker preference ($z=-1.56$, $p=.13$).

4.3.2.2 Gender

The impact of gender upon donations when the endowment was earned was assessed. Gender did not have a significant impact upon overall donation behaviour ($U=381.50$, $p=.86$), the decision to donate ($\chi^2(1)=0.01$, $p=1$) or on positive donations ($U=41.50$, $p=.36$).

The impact of sticker preference in the Earning treatment was also assessed for girls and boys independently and revealed that neither girls nor boys showed an effect of preference ($z=0.52$, $p=.66$; $z=1.70$, $p=.11$, respectively).

4.3.2.3 Sibling status

The donations of singletons and firstborns in the Earning DG were compared in order to confirm whether these groups could be combined. There were no differences between singletons and firstborns in the Earning treatment in overall donation profiles ($U=124.00$, $p=.39$), the decision to donate ($\chi^2(1)=0.09$, $p=1$) or positive donations ($U=19.00$, $p=.92$). As such, these groups were combined and subsequent analyses were performed according to whether or not children possessed older siblings. While there were no differences in overall donation profile ($U=317.00$, $p=.33$) or the decision to donate ($\chi^2(1)=0.25$, $p=.78$), children with older siblings made significantly smaller positive donations than children without older siblings in the Earning treatment ($U=23.00$, $p=.05$; see left hand panel of Figure 4.2).

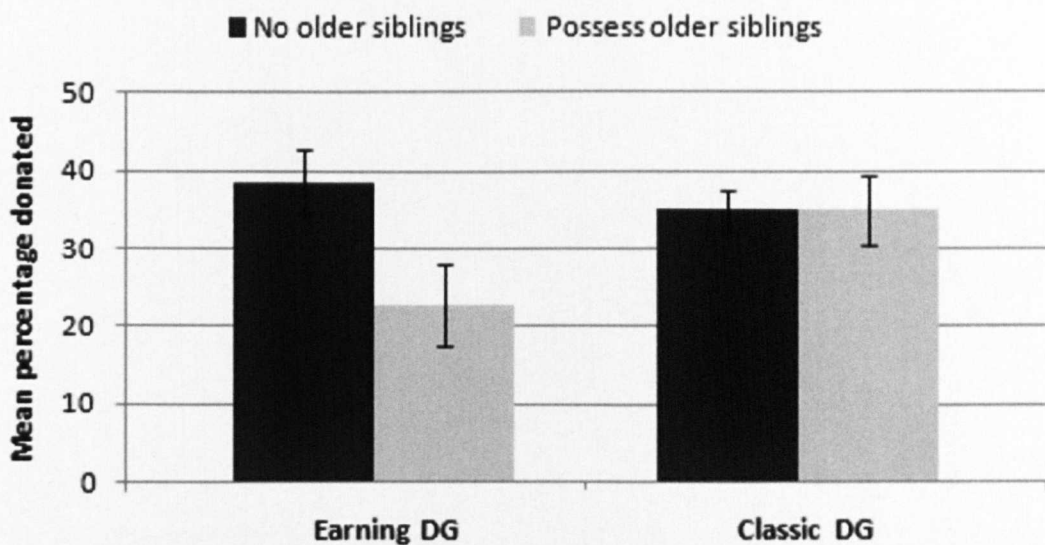


Figure 4.2: Mean positive donations in the Earning DG and the Classic DG as a function of possession of older siblings (error bars represent the standard error of the mean)

The impact of sticker preference in the Earning treatment was also assessed for children with and without older siblings independently. Consistent with findings in Chapter 2, children with older siblings did not show an effect of sticker preference ($z=0.14$, $p=1$).

However, children without older siblings did show a significant effect of sticker preference in the present study ($z=2.50, p=.01$), with more least liked stickers being donated.

4.3.2.4 Confounding variables

Table 4.5 shows descriptive statistics for maths and ToM ability by sibling status, For the group as a whole the maths equal division and same/more tasks were found to be significantly correlated ($r_s=.41, p=.002$). For ToM, 55.36% of children were consistent in their response on the deceptive box task and Sally/Anne task (see Table 4.4). Of those who were inconsistent, children were more likely to pass the Sally-Anne task (84.00%) than the deceptive box task (16.00%; McNemar $\chi^2 p=.001$).

Table 4.4: Consistency table showing the number of children in the group as a whole passing and failing the two ToM tasks

	Fail Sally-Anne	Pass Sally-Anne
Fail Deceptive box	16	21
Pass Deceptive box	4	15

Table 4.5: Maths and ToM ability in the Earning DG across sibling groups (standard deviations in parentheses; ranges in italics)

		Singletons	Firstborns	Lastborns	Group differences
Maths tasks	Equal division task (mean score/18)	14.00 (4.65) <i>4-18</i>	15.21 (3.22) <i>7-18</i>	14.36 (4.46) <i>4-18</i>	$H(2)=1.25, p=.54$
	Same/more task (mean score/21)	20.18 (1.08) <i>18-21</i>	20.38 (1.01) <i>18-21</i>	19.61 (2.11) <i>14-21</i>	$H(2)=1.35, p=.51$
	Composite maths (mean score/39)	34.18 (4.94) <i>25-39</i>	35.58 (3.50) <i>28-39</i>	33.19 (5.72) <i>21-39</i>	$H(2)=1.45, p=.48$
ToM tasks	Deceptive box task (pass rate)	.27 (.47)	.46 (.51)	.24 (.44)	$\chi^2(2)=2.57, p=.31$
	Sally/Anne task (pass rate)	.45 (.52)	.67 (.48)	.71 (.46)	$\chi^2(2)=2.18, p=.37$
	Composite ToM score (mean score/2)	.73 (.65) <i>0-2</i>	1.13 (.80) <i>0-2</i>	.95 (.74) <i>0-2</i>	$H(2)=2.15, p=.34$

Analyses were conducted to ascertain whether any of the additional variables measured contributed to the observed donation behaviour (summarised in Table 4.6). As there was a significant correlation between the maths tasks the composite score was entered into the correlations. As there was a significant difference between the frequency of passing the two ToM tasks, individual scores were entered into the correlation rather than composite scores. Positive donations in the Earning DG showed a significant negative relationship with time spent with peers ($r_s=-.43, p=.05$) and SES ($r_s=-.52, p=.02$): as these variables decreased, positive donations increased. Positive donations in the Classic DG showed a significant negative relationship with performance on the deceptive box task, with children who passed the task donating less ($r_{pb}=-.45, p=.03$). No other relationships were significant.

Table 4.6: Relationships between confounding variables and donations in the Earning DG and the Classic DG

Overall donation profile	Earning DG	Classic DG
Maths composite score	$r_s=-.14, p=.31$	$r_s=-.06, p=.66$
Time with peers	$r_s=.04, p=.76$	$r_s=-.13, p=.34$
SES	$r_s=.06, p=.66$	$r_s=-.15, p=.28$
Deceptive box task	$r_{pb}=-.14, p=.32$	$r_{pb}=-.16, p=.23$
Sally/Anne task	$r_{pb}=-.14, p=.31$	$r_{pb}=-.05, p=.71$
Decision to donate	Earning DG	Classic DG
Maths composite score	$r_{pb}=-.09, p=.53$	$r_{pb}=-.09, p=.51$
Time with peers	$r_{pb}=.08, p=.54$	$r_{pb}=-.06, p=.66$
SES	$r_{pb}=.16, p=.28$	$r_{pb}=-.21, p=.12$
Deceptive box task	$\chi^2(1)=0.43, p=.57$	$\chi^2(1)=0.20, p=.79$
Sally/Anne task	$\chi^2(1)=0.753, p=.57$	$\chi^2(1)=0.01, p=1$
Positive donations	Earning DG	Classic DG
Maths composite score	$r_s=.10, p=.67$	$r_s=-.24, p=.31$
Time with peers	$r_s=-.43, p=.05$	$r_s=-.18, p=.43$
SES	$r_s=-.52, p=.02$	$r_s=.32, p=.14$
Deceptive box task	$r_{pb}=-.20, p=.40$	$r_{pb}=-.45, p=.03$
Sally/Anne task	$r_{pb}=.13, p=.57$	$r_{pb}=-.17, p=.45$

A simultaneous multiple regression was subsequently conducted in order to establish whether the effect of possession of siblings on size of positive donations in the Earning DG

could be observed when additional contributing variables were controlled (no other regressions were conducted as no relationships were observed with overall donations or the decision to donate). As such, possession of older siblings, age, time with peers and SES were entered as predictor variables (variables that produced a significant relationship with positive donations above were entered as predictors), with overall donations in the 4 condition as the dependent variable. The sample size was very small ($n=19$) so the results should be interpreted with caution. A significant model was produced ($F_{3,15}=15.59$, $\Delta R^2=.71$, $p<.001$) and possession of older siblings, time with peers and SES emerged as significant predictors: children with older siblings donated less while donations decreased as time with peers and SES increased; coefficients are summarised in Table 4.7.

Table 4.7: Summary of multiple regression analysis for variables predicting positive donations in the Earning DG ($n=19$)

	B (SE)	Significance	95% CI for B
Constant	9.60 (1.03)	<.001	7.42-11.79
Possession of older siblings	-1.47 (0.45)	.005	-2.43-0.52
Time with peers	-0.08 (0.02)	.001	-0.13-0.04
SES	-0.05 (0.01)	.002	-0.07-0.02

4.3.3 Effect of earning the endowment

The Earning and Classic groups were directly compared to ascertain whether an earning effect could be observed. Overall, there were no significant differences between the Earning DG group and the Classic DG group in terms of their overall donation profiles ($U=1517.00$, $p=.74$), the decision to donate ($\chi^2(1)=.34$, $p=1$), or positive donations ($U=208.00$, $p=.57$).

In order to ascertain whether there was an influence of gender upon the earning effect, data were examined for girls and boys independently. Neither girls nor boys showed a difference in donations between the Earning DG and the Classic DG for overall donations ($U=321.00$, $p=.14$; $U=330.00$, $p=.33$, respectively) the decision to donate ($\chi^2(1)=1.41$, $p=.29$; $\chi^2(1)=0.93$, $p=.39$, respectively), or positive donations ($U=61.00$, $p=.27$; $U=32.50$, $p=.83$).

Data were also examined independently according to possession of older siblings in order to explore its impact upon the effect of earning the endowment. Children without older siblings did not show a significant effect of earning their endowments for overall donation profile ($U=578.00$, $p=.49$), the decision to donate ($\chi^2(1)=0.34$, $p=.63$) or positive donations ($U=74.00$, $p=.62$). Children with older siblings did not show a significant effect of earning their endowments for the overall donation profile ($U=158.00$, $p=.13$) or the decision to donate ($\chi^2(1)=1.17$, $p=.35$). However, out of those who made positive donations, there was a trend towards children with older siblings donating less in the Earning DG than in the Classic DG ($U=18.00$, $p=.10$; see Figure 4.2).

4.3.4 Summary of results

Re-examining the Classic DG data (i.e. data from Chapter 2 including only those who received the 10 condition first) made little difference to the results, although children donated more of their least-preferred stickers in the Classic DG (this difference was not significant in Chapter 2) and the trend towards girls donating more often in Chapter 2 became significant in the Classic DG. While gender did not influence the amount donated in the Earning DG, sibling status did have an effect, with children with older siblings making smaller positive donations. Sticker preference did not influence the amount donated in the Earning DG group as a whole, for boys and girls individually, or for children with older siblings. Children without older siblings, however, donated more of their least-liked than

their most-liked stickers. No difference in donations was observed between the whole Earning DG group and the whole Classic DG group, nor was there a difference between the two when boys and girls were examined independently. There was a trend towards children with older siblings making smaller positive donations in the Earning DG; no difference was observed for children without older siblings. When the relationship between donation behaviour and potential confounding variables was examined, positive donations in the Earning DG showed a significant negative relationship with time spent with peers and SES, decreasing as these variables increased. When these variables were entered into a regression along with the possession of older siblings, possession of siblings, time with peers and SES all emerged as significant predictors, with children with older siblings donating less and donations decreasing as time with peers and SES increased.

4.4 Discussion

The current study is the first to examine whether an earning effect can be observed in the DG performance of 4-5 year-old children. It has demonstrated that at this young age the earning effect is still to fully emerge, with only those children with older siblings showing a small decrease in positive donations when endowments are earned. However, earned endowments appear to be influenced by a greater variety of social factors than windfall endowments.

4.4.1 Earning effect

While adults show a consistent earning effect in the DG (Carlsson et al., 2010; Cherry, 2001; Cherry et al., 2002; List & Cherry, 2008; Hoffman et al., 1994) and children in middle childhood have also demonstrated an earning effect in a non-DG sharing task (Staub & Noerenberg, 1981), 4-5 year-old children showed little effect of the origin of their endowment upon donations in the DG. Consistent with the only other study to date to examine the effect of earning in young children (Willis et al., 1977), no earning effect was observed for the group as a whole, for boys and girls individually or for children without older siblings. Children with older siblings demonstrated only a small influence of earning their endowment, showing a nonsignificant tendency to make smaller positive donations in the Earning DG than in the Classic DG (see Figure 4.2). While it is possible that the lack of an overall earning effect is due to a lack of power, a power analysis on the basis of Carlsson et al.'s (2010) findings, in which a significant earning effect (with an effect size of 1.39 and power of .99) was obtained with adults, demonstrates that a sample size of only 16 participants per group would be necessary to find a similar effect should one be present. Given that there were 56 participants in each group, we can be confident that a lack of power is not an issue with regard to the current null result.

There are a number of factors that may have contributed to the lack of an earning effect in 4-5 year-olds. It may be that at this young age children are not yet equipped to factor the characteristics of the endowment into their allocation decision. However, 3-6 year-old children can modulate their DG donations according to the desirability of the endowment, donating more of a less desirable resource (Blake & Rand, 2010). As they are able to incorporate information about the endowment into their donations, it seems unlikely that they are not capable of incorporating information about the source of the endowment into their decisions.

Alternatively, the present findings may be due to the design of the study. Children may not have felt that they had earned their stickers, either because the earning tasks were not long enough or they were not sufficiently tedious. Longer or more uninteresting tasks may yield a different result; however, at this young age 15 minutes is a long time. Indeed, many of the children expressed a desire to undertake a different task so it seems likely that the maths tasks were onerous enough to cause the children to feel that they had earned their stickers. An effect might have been observed if the number of stickers earned had been contingent upon performance as is often the case with the monetary endowment in adult studies (e.g. Cherry et al., 2002; Oxoby & Spraggon, 2008), which would increase the legitimacy of ownership of the stickers. However, a significant earning effect can be observed in adults when effort (time spent filling in a survey) rather than achievement is the means of acquisition of the endowment (Carlsson et al., 2010). Furthermore, young children are routinely given things without necessarily earning them (food, clothing, shelter, not to mention pocket money, etc.) and so legitimacy may not even be a salient factor at this young age. Making rewards contingent upon performance may therefore not be sufficient to elicit an earning effect at this young age. Conversely, the present study may not minimise the difference in uncertainty of the assets between the two conditions. Studies in

adults have found that the unexpectedness of the endowment is a significant influence upon the likelihood of sharing it (Arkes et al., 1994; Kameda et al., 2002); perhaps decreasing the uncertainty in the Earning DG by giving the child time to reinforce their ownership of the stickers would create a larger difference in donation behaviour between the two conditions. Arkes et al. (1994) suggest that the earning effect may occur through mental accounting, in which resources are mentally allocated to different budgets, and that due to their unexpectedness windfall assets may not have time to be allocated to a budget which causes them to be more spendable. Asking the child what she plans to do with her stickers may encourage her to allocate them to a mental account, decreasing their 'spendability' and increasing the earning effect.

Despite these possibilities, it is plausible that children simply need time to learn that it is socially acceptable to be less generous when sharing an earned rather than a windfall endowment. Lastborn children, who appear to learn a sharing norm more rapidly than children without older siblings (see Chapter 2), came the closest to demonstrating an earning effect. Indeed, while sibling status did not influence overall donations or the decision to donate, children with older siblings made significantly smaller positive donations in the Earning DG treatment than those without older siblings (a change from findings in the Classic DG, in which no sibling effect was observed). Furthermore, the effect of possession of older siblings remained a significant predictor of positive donations even when the influence of other variables was controlled. This, combined with the trend of children with older siblings making smaller positive donations in the Earning DG than the Classic DG⁹, suggests that children with older siblings are beginning to learn the legitimacy

⁹ Although these groups significantly differed in terms of SES, this is unlikely to be driving the trend for a difference in positive donations of children with older siblings. Children in the Earning DG had a lower SES than children in the Classic DG, while SES had a negative relationship with positive donations in the Earning DG, with donations increasing as SES decreased. This is inconsistent with

norm. While children without older siblings did not show any kind of earning effect, they did demonstrate some modulation of their donations in the Earning DG by donating fewer of their most liked stickers, while in the Classic DG no such difference was observed. Children with older siblings showed a trend towards donating more of their least-preferred stickers in the Classic DG but no effect of sticker preference in the Earning DG, possibly because they made smaller positive donations than children without older siblings, consequently keeping for themselves the least preferred stickers that those without older siblings were donating. It is possible that the earning effect initially manifests by keeping more preferred resources for oneself, and reduced sharing when an endowment is earned appears afterwards.

The influence of siblings appears to change when the endowment is earned, with children with older siblings making smaller positive donations than those without when the endowment was earned (with no difference in the decision to donate), while in the Classic DG possessing older siblings did not significantly influence donations. While the change in the sibling effect according to the source of the endowment does not translate into a significant earning effect, it appears that children with older siblings are slightly more sensitive to the effect of having earned their endowment.

No previous study has examined the influence of gender upon the earning effect in children. As expected, and consistent with Carlsson et al.'s (2010) findings in adults, gender did not influence the earning effect. While those studies using the Classic DG that have found a gender effect have found women (Eckel & Grossman, 1998; Kamas et al., 2008) and girls (Gummerum et al., 2008, 2010; Harbaugh et al., 2003) to be more generous than men and boys (and indeed, re-analysis of the Classic DG data in section 4.3.1 to include only

the observed trend of children with older siblings donating less in the Earning DG than the Classic DG.

those who received the 10 condition first showed girls to donate significantly more often than boys), it appears that both genders modulate their donations to an equal extent (or perhaps more appositely, both genders show equal lack of modulation) when the endowment is earned.

4.4.2 Confounding variables in the Earning DG

In the 10 condition in Chapter 2, a trend towards girls donating more often than boys was observed. This, combined with a larger proportion of girls' donations being composed of their less-preferred stickers, led to the interpretation of this pattern as girls making slightly more token donations than boys (see section 2.4.3). When the Classic DG data were re-examined in section 4.3.1, the influence of gender became significant, with girls donating more often (there were no gender differences in the size of positive donations or in term of sticker preference). However, when the Earning DG data from the present study were examined independently, no effect of gender was found upon any measure of donation behaviour (overall donations, decision to donate, positive donations or proportion of least preferred stickers donated). Girls may therefore slightly decrease their token donations in the Earning DG and while this is clearly not a significant difference, it may demonstrate the beginnings of earning-based modulation in 4-5 year-old girls. It has been suggested that women may be more generous and more influenced by experimental design than men as they are more sensitive to social cues (Croson & Gneezy, 2009). This increased sensitivity may also lead them to internalise a legitimacy norm more rapidly, although further study with older children would be necessary to confirm this.

A significant relationship was found between age and positive donations in the Earning DG, with donation size decreasing as children aged. While this may reflect the developmental acquisition of the legitimacy norm, the age effect did not obtain in the regression when

other variables were controlled. Given the small age group used in the present study and the lack of an age effect in the Classic DG it seems more likely, therefore, that age is confounded with sibling status, SES or time spent with peers and the correlation with positive donations is spurious.

A significant relationship was observed between SES and positive donations in the Earning DG, with the size of the donation decreasing as SES increased; moreover, this was the strongest predictor of donations in the regression. This is contrary to the findings in the Classic DG and those of Benenson et al. (2007), which showed no relationship between DG performance and SES. However, this is consistent with Carpenter et al.'s (2005) findings in adults; similarly, SES showed a significant negative relationship with overall donations and the decision to donate in the 4 condition of Chapter 2 (see section 2.4.2). It was suggested that low SES children may internalise a sharing norm earlier due to the increased likelihood that they need to share resources. It is interesting, therefore, that the opposite appears to be the case with the legitimacy norm, given that children who have internalised this norm would be more likely to make a small donation or even not donate at all. However, low SES leads to stronger egalitarianism (Kameda et al., 2005) and so it may be that the sharing norm simply overrides the legitimacy norm in low SES children.

The present study confirmed the finding in the Classic DG that maths ability had no impact upon donations, despite more complex tasks being included as part of the earning phase: it appears that mathematical ability does not influence DG behaviour. ToM ability also showed no relationship with performance on the Earning DG, consistent with previous findings in young children (Lucas et al., 2008; Sally & Hill, 2005) and the Classic DG group. While behaviour in the Earning DG was not influenced by cognitive factors, social factors appear to have a strong influence. Indeed, contrary to findings with the Classic DG (which

showed no relationship) time spent with peers showed a significant negative relationship with positive donations, with the amount donated decreasing as time with peers increases. This supports the notion that learning a legitimacy norm is an important factor in the behaviour observed in the present study and children do so from their peers as well as from their siblings. This is particularly interesting as peers do not appear to influence the acquisition of the sharing norm (see section 2.4.2) but do seem to influence the acquisition of a norm that modulates its implementation.

It is interesting that only positive donations showed any effects in the present study but overall donations and the decision to donate did not, while in the Classic DG the reverse was the case. Furthermore, Saunders and Lynn (2010) found that helping motives rather than social norms influence prosocial giving, also the opposite pattern to that observed in the Earning DG. The present study may provide the first evidence that social norms can influence how much a person gives as well as the choice to give in the first place. Further study is necessary to confirm this finding and further investigate how social norms influence altruistic behaviour.

The present study has examined how the characteristics of the endowment influence DG behaviour and has demonstrated that 4-5 year-old children show little effect of earning their endowment. However, it appears that some children are beginning to modulate their donations in line with a legitimacy norm and this emerging influence appears to be modulated by a number of social factors, including possession of older siblings, SES and time spent with peers. The next chapter will further examine the influences upon children's altruistic behaviour, investigating whether the characteristics of the recipient affect DG donations.

Chapter 5: The influence of recipient deservingness in preschool children

5.1 Introduction

The previous chapter added context to the DG by modulating the characteristics of the endowment and asking children to earn their stickers. An alternative means of adding context to the DG is to examine how the characteristics of the recipient rather than those of the endowment itself influence donation behaviour. Adults are known to give more when they are given information about who will receive the donation and are more generous to more deserving recipients; the present study aimed to investigate whether 4-5 year-old children are able to incorporate positive and negative information about the recipient into their donation decisions.

5.1.1 Reputation and reciprocity

The concept of social desirability is familiar to psychologists: people will attempt to present a socially acceptable façade that may not reflect their real beliefs, actions or feelings by either over-reporting desirable responses or downplaying undesirable responses (Zerbe & Paulhus, 1987). Social desirability influences behaviour in part because of the consequences for reputation. When an individual's actions are directly or indirectly observed by another person a reputation is formed which can, in turn, influence the nature and extent of future reciprocity. Direct reciprocity occurs when the recipient of an action responds to the actor in a tit-for-tat fashion (see Axelrod & Hamilton, 1981), while indirect reciprocity is the result of the actor being aware of the individual's previous actions with a third party and responding in kind – they hear of the person's reputation and react accordingly (Alexander, 1987). Reputation is particularly important when the actor has not previously interacted with the recipient as they do not have previous personal interactions to inform them of the recipient's deservingness and trustworthiness. As such, indirect reciprocity is often

advanced as an explanation for people's prosocial behaviour in one-shot economic games such as the DG, in which direct reciprocity is not an option (e.g. Engelmann & Fischbacher, 2009).

5.1.2 DG and recipient characteristics in adults

When adults' donations in the DG are not anonymous, and therefore may have an impact upon reputation, dictators are more generous (e.g. Piazza & Bering, 2008). Conversely, the reputation of the recipient also influences the dictator, even when the dictator himself is completely anonymous. Dictators donate more when they are informed of their recipient's decision in a previous, unrelated DG than when they are given no information about the recipient, while the amount donated is positively correlated with their partner's previous donations despite there being no opportunity for future interaction: people appear to reward generous behaviour. Moreover, even recipients who had previously been only mildly generous or even selfish receive more than those whose prior behaviour was unknown (Fehr & Schneider, 2010; Servátka, 2009, 2010). It appears that positive information is not necessary to increase DG donations: simply giving the dictator information about the recipient is sufficient to increase donations even if that information demonstrates previous selfishness.

Information about the recipient has consistently been found to increase adults' giving in the DG. People give more to members of their ingroup than to strangers or outgroup members and more still to kin, most likely because ingroup and family members are most likely to have the opportunity to reciprocate in the future (Ben-Ner & Kramer, in press; Ben-Ner et al., 2009). Findings according to recipient gender are mixed, with Ben-Ner, Kong et al. (2004) finding that women send less to recipients of the same gender while men were not influenced by recipient gender. Dufwenberg and Muren (2006), on the other hand, found

that both men and women give more to women than to men. Poor people receive larger DG donations than anonymous individuals (Brañas-Garza, 2006), as do charities (Eckel & Grossman, 1996). These greater donations to more deserving or needy recipients are modulated by the perceived worthiness of the recipient: recipients who are viewed as less worthy or more responsible for their own misfortune receive smaller donations than more worthy or blameless recipients (Fong, 2007; Fong & Luttmer, 2010; Fong & Oberholzer-Gee, 2011).

DG behaviour is not only influenced by potentially relevant information: irrelevant information can also increase donations. Burnham (2003) asked dictators to view a photograph of the recipient prior to dividing their endowment, finding that egalitarianism increased compared to a no photo baseline. They suggest that the photograph increases empathy with the recipient, leading to more equal splits of the pie. Even learning the family name of the recipient prior to dividing the endowment is sufficient to increase their salience in the dictator's donation decision and increase allocations (Charness & Gneezy, 2008), although learning the day and month of the recipient's birth does not appear to be sufficient to significantly increase donations (Servátka, 2009). Bohnet and Frey (1999) found that while one-way identification of the recipient by the dictator did not increase donations from baseline, donations did increase when seeing the recipient was combined with learning their name, degree, hobbies and home town. Receiving an anonymous message from the recipient also increases donations; indeed, even receiving an irrelevant message from a previous recipient to a previous dictator increases donations (Mohlin & Johannesson, 2008). In all of the studies above the dictator remains completely anonymous and so there are no greater reputational repercussions for selfishness than there would be when the recipient is also completely anonymous. Adults' DG behaviour is clearly highly sensitive to the provision of information about the recipient, whether or not that

information is relevant to their donation decision. This influence of anonymity reduction is often assumed to be due to information about the recipient increasing the dictator's empathic response (e.g. Bohnet & Frey, 1999; Burnham, 2003). Indeed, these findings are consistent with the identifiable victim effect (Schelling, 1968), in which people are more likely to provide aid to an identified victim than to a statistical victim as empathy is aroused when identifying information is provided (Jenni & Loewenstein, 1997; Small, Loewenstein, & Slovic, 2007). Nonetheless, the influence of provision of information upon the elicitation of empathy has yet to be directly assessed in conjunction with the dictator game.

5.1.3 Information about the recipient in children

Children have also been demonstrated to be sensitive to the provision of information about the recipient of prosocial behaviour. Braband and Lerner (1974) demonstrated that 9-10 year-olds provide more help to another child who is not responsible for their situation than to someone who has caused their own problems, while Barnett (1975) found that boys were more likely to share tokens that they had won in a bowling game with a child who has not had the opportunity to win their own than with someone who has played and lost.

Children, like adults, also prefer to help members of their ingroup or people who are more similar to them; 5-9 year-olds, for instance, are more likely to give money to help a disabled child than a disabled adult (Willis et al., 1977). Goeree, McConnell, Mitchell, Tromp and Yariv (2010) asked 10-12 year-old girls in a closed social network to play a DG and found that the closer in the social network the recipient was to the dictator, the larger an allocation they received: children gave more to their friends than to their non-friends. Moore (2009) asked 4-6 year-olds to play a resource allocation game with friends, non-friends and strangers. In sharing trials, where the child had to choose between two stickers immediately for herself or one for herself and one for the other later (i.e., there was a cost

to the child to share), children were more likely to share with a friend than a non-friend or stranger; they did not discriminate between a non-friend and a stranger. Thus, even young children are clearly able to incorporate information about the recipient into their provision of prosocial behaviour. However, there is no evidence to date as to whether young children incorporate information about the reputation of the recipient in their DG decisions.

5.1.4 Present study

The present study sought to discover whether 4-5 year-old children are able to take reputational information into account when making their DG decisions. Children were informed of the previous behaviour of two children that the experimenter had previously encountered, whether 'nice' or 'naughty', and offered the opportunity to donate stickers to these children. This direct comparison between DG donations to recipients with positive or negative character traits has not previously been conducted with either adults or children. However, adults find people with positive character traits to be deserving of positive outcomes and people with negative character traits to be deserving of negative outcomes (Lupfer & Gingrich, 1999). Furthermore, 6 year-olds have been demonstrated to understand that people's actions influence others' judgements of them (Hill & Pillow, 2006), while there is evidence that children as young as 3 years understand that there are direct and indirect reciprocity norms and they expect others to abide by these norms in a sharing game (Olson & Spelke, 2008). As such, 4-5 year-old children are expected to be able to incorporate information about the recipient into their DG behaviour and modulate their DG donations according to the valence of the reputation of the recipient. It is therefore also expected that children will implement an indirect reciprocity norm and donate more to children who have previously exhibited positive behaviours than to those who have behaved negatively.

The present study also sought to establish whether 4-5 year old children were sensitive to mere information possession. Given adults' extreme sensitivity to information possession in the DG it seems likely that children will donate more to a recipient about whom they possess positive information than a recipient about whom they possess no information. However, there is little evidence to suggest how children will respond to negative information. Children may give less than in anonymous conditions as the recipient is known to be undeserving of reward, while the anonymous recipient may be deserving or undeserving. Conversely, children may behave similarly to adults with possession of negative information increasing donations compared to anonymous conditions (Servátka, 2010); this may be either because the child does not perceive the recipient to be undeserving or because empathy is increased due to the reduction of anonymity. As such, a measure of deservingness (which is cost-free to the child) will also be taken to distinguish between these potential explanations.

Finally, the impact of gender and possession of older siblings upon potential reputation and information possession effects will also be assessed. As boys donated less often than girls in the Classic DG (see section 4.3.1.1) it seems likely that they will show a greater effect of possession of information than girls; however, there is little evidence to suggest whether or not boys and girls will be differentially influenced by the valence of the recipient's reputation. Sibling status effects have only previously emerged under restricted conditions (i.e. with endowments of 4 but not 10 items) so an influence of sibling status is not expected due to the use of endowments of 10 stickers¹⁰ in the present study.

¹⁰ An endowment of 10 stickers was used in order to provide sufficient sensitivity to capture differences according to possession of information and deservingness.

5.2 Methods

5.2.1 Participants

Seventy-five 4-5 year-old children (mean age 4:11; age range 4:0 to 5:5) participated in the study. Children were recruited from schools in London and Belfast and were tested in a quiet environment in their school setting by third year undergraduate project students. All three students were trained before the onset of testing to deliver the study in the same manner. At the time of consent parents completed a questionnaire detailing demographic information such as their child’s age, gender, the number and ages of the child’s siblings and the average time the child spends in childcare and extracurricular activities per week (see Appendix 1 for the questionnaire). As in previous chapters, children were recruited on the basis of sibling status to fall into the following groups: singletons (no siblings), firstborns (only younger siblings) and lastborns (only older siblings). As in Chapter 4, the comparison group was composed of the children who had received the 10 condition first in the classic dictator game in Chapter 2 (Classic DG). See Table 5.1 for sample characteristics for each group; see Table 5.2 for descriptive statistics in the Deservingness DG by sibling group..

Table 5.1: Descriptive statistics in the Deservingness DG and the Classic DG (standard deviations in parentheses; ranges in italics)

	Deservingness DG	Classic DG	Group differences
Total n	75	56	
Gender/ female:male	40:35	28:28	
Siblings (singletons:firstborns:lastborns)	21:26:28	11:25:20	
Mean age/months	58.66 (4.40) <i>48-65</i>	59.41 (6.00) <i>49-72</i>	$U=1963.50, p=.53$
Mean time spent with unrelated peers/hours per week	29.46 (23.48) <i>12.50-48.50</i>	30.02 (10.85) <i>3.00-45.75</i>	$U=1469.50, p=.002$
SES/percentile	40.01 (23.48) <i>22.19-71.10</i>	74.20 (25.79) <i>12.09-99.53</i>	$U=732.00, p<.001$

Table 5.2: Descriptive statistics in the deservingness DG across sibling groups (standard deviations in parentheses; ranges in italics)

	Singletons	Firstborns	Lastborns	Group differences
Total n	21	26	28	
Gender (female:male)	13:8	13:13	14:14	
Age/months (mean)	59.43 (3.54) <i>51-64</i>	57.73 (4.97) <i>48-65</i>	58.96 (4.43) <i>50-65</i>	$H(2)=1.26, p=.53$
Time spent with unrelated peers (mean hours/week)	32.40 (3.23) <i>25.00-40.00</i>	28.42 (7.24) <i>12.50-48.50</i>	28.21 (6.02) <i>12.50-36.50</i>	$H(2)=8.45, p=.02$; singletons > firstborns ($U=164.50, p=.03$), singletons > lastborns ($U=369.50, p=.01$)
SES (mean percentile)	43.25 (24.72) <i>22.19-71.10</i>	37.50 (22.85) <i>22.19-71.10</i>	39.92 (23.67) <i>22.19-71.10</i>	$H(2)=0.28, p=.87$

5.2.2 Procedure

Children first took part in two iterations of the DG, in which they were given a description of the recipient's behaviour before making their allocations. This was followed by a set of maths tasks and two false belief measures of ToM.

5.2.2.1 DG

The experimenter began by describing an encounter with a child she had met the day before. This fictional child was portrayed as real, of the same gender as the participant and attending a school that the experimenter had visited the day before. Depending upon the experimental condition, the fictional child had exhibited either responsible (Nice condition) or disruptive (Naughty condition) behaviour (see Appendix 7 for the stories). Following the description, as a measure of her understanding of the account, the participant was asked whether she thought that the child in question was nice or naughty; this also served to force the participant to make a conscious appraisal of the nice/naughty child's behaviour.

The participant was then offered a selection of 30 stickers and asked to choose her favourite. This sticker was put aside and she was asked to choose her favourite from the remaining stickers; this process was repeated until 10 stickers had been chosen. The stickers were arranged from most to least favourite on an array composed of a row of 10 slots and shown to the participant. The participant was then given the opportunity to give some of her stickers to the child in the story, who had received none as the experimenter had not had enough stickers with her for everyone. As in previous versions of the DG, the child was instructed to place all of the stickers that she wished to keep in an envelope bearing her name while the experimenter looked away; the remainder would be placed in an envelope bearing the other child's name (Bill/Ted for boys and Beth/Jane for girls; the condition with which the name was associated was counterbalanced). Both envelopes contained a colouring picture so that no child received nothing, and also to reduce donation through guilt-avoidance. It was emphasised that the procedure was anonymous, that the child was not obliged to give any stickers away and that the decision was completely up to her. Once the child had divided the stickers as she saw fit, the envelopes were sealed and the envelope for the other child was posted into a box.

The experimenter then told the participant about a second child that she had encountered in a different class the day before. This child exhibited the opposing behaviour to the first child, i.e. was disruptive if the previous child had been responsible and vice versa. The order in which the conditions were received was counterbalanced as far as possible across gender and sibling status (see Appendix 8). The participant was again asked to make an appraisal of this child's behaviour, whether naughty or nice, before being offered a different selection of 30 stickers from which to choose her favourite 10. As before, the participant was offered the opportunity to give some of her stickers to the other child, who again had none.

Once she had made her division and the envelope had been posted, the child was reminded of her appraisals of the children from the stories and asked three further questions: who she liked best, whether the Nice child should be allowed to go on an upcoming school trip and whether the Naughty child should be allowed on the same school trip (the order of the final two questions were counterbalanced across participants). Contrary to the DG, which provides a measure of deservingness at a cost to the participant, the answers to these questions provided a measure of the likeability and deservingness of the children in question at no cost to the participant.

5.2.2.2 Maths tasks

As in previous chapters, once the iterations of the DG were complete the child took part in a set of tasks of mathematical understanding: the *equal division task* and the *same/more task*. These tasks were identical to those presented in Chapter 2 (see section 2.2.2.2 for a full description). As previously, scores were summed to give a composite maths score, expressed as a percentage of the maximum possible score.

5.2.2.3 ToM tasks

Finally, once the maths tasks were complete, the child was given two measures of ToM ability: the deceptive box task based on Gopnik and Astington's (1988) *Smarties task*, and a pictorial adaptation of Baron-Cohen, Leslie and Frith's (1985) *Sally/Anne task*. These tasks were identical to those presented in previous chapters (see section 2.2.2.3 for a full description). As previously, scores were summed to give a composite ToM score, with a maximum possible score of 2.

5.3 Results

Cases where eight or more items are donated are often removed from the analyses (see Frohlich et al., 2001). However, only one such case occurred in the present data; this case was therefore retained. Data were examined for skewness and kurtosis. As data were not normally distributed, non-parametric analyses were employed. An alpha level of .05 was used for all statistical tests. In order to be conservative in the analyses, all tests were two-tailed.

5.3.1 Deservingness effect

Data were first examined in terms of the *overall donation profile* (i.e. the proportion of their stickers donated by each child). This was then broken down into analyses of the *decision to donate* (i.e. donating nothing or donating one or more stickers) and *positive donations* (i.e. the proportion of stickers donated by only those who chose to donate). See Table 5.3 for mean donations; Figure 5.1 shows the distributions of donations. The modal offer was zero in both treatments; when only positive donations were taken into account the modal offer was four stickers for Nice, while the mode lay at four and five in the Naughty treatment.

Table 5.3: Mean proportion of endowment donated to Nice and to Naughty (standard deviations in parentheses)

	Deservingness DG: Nice	Deservingness DG: Naughty
Overall donation	29.60 (21.84)	21.73 (22.14)
Decision to donate: proportion choosing to donate	73.33	42.67
Positive donations	40.36 (14.53)	37.91 (15.36)

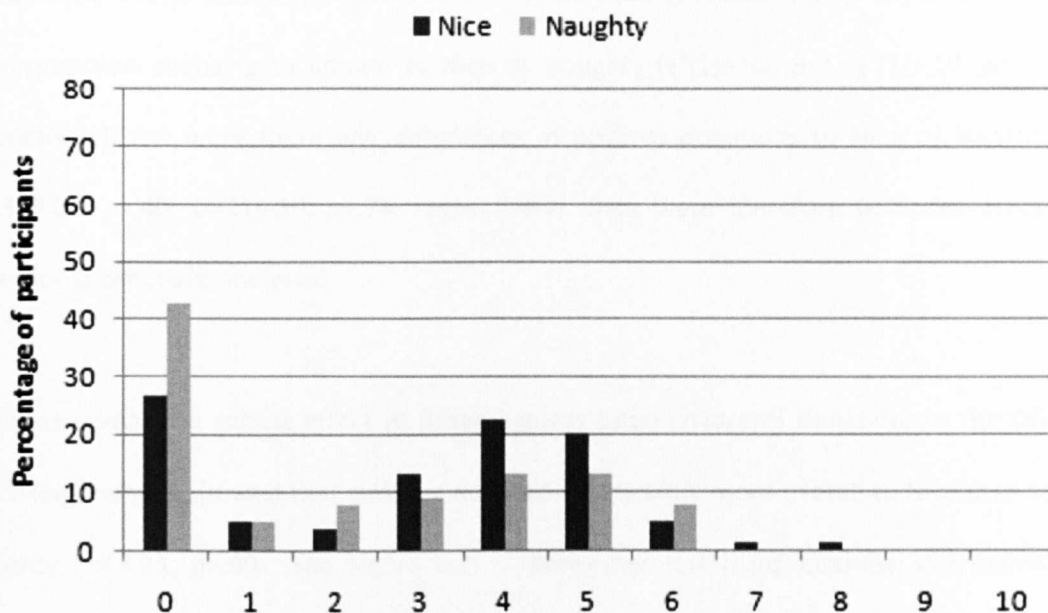


Figure 5.1: Donation distributions in the Nice and Naughty treatments

Data were first examined to ensure that the children were able to discriminate between the behaviour of the nice child (hereafter Nice) and the naughty child (hereafter Naughty). 100% of children correctly identified Nice as nice and Naughty as naughty. When asked who they liked best, a two-sided z-test showed that a significantly greater proportion of children preferred Nice to Naughty ($z=11.92, p<.001$). In response to the question of whether each child should be allowed to go on the school trip, a significantly greater proportion of children thought that Nice should be allowed to go than thought Naughty should go ($z=11.59, p<.001$). Indeed, only 2.67% of children answered that Naughty should be allowed on the trip. As such, it appears that when there is no cost to the self the children were able to appropriately modify their responses based upon the recipient’s characteristics and rated Nice as more deserving of reward than Naughty.

Data were subsequently examined in terms of the order in which the children received the conditions, i.e. whether the child donated to Nice or Naughty first. Mann-Whitney analyses revealed no difference in overall donations to Nice or Naughty ($U=656.50, p=.73; U=677.00,$

$p=.91$, respectively) according to order. Similarly, chi-squares revealed no effect of order on the proportion choosing to donate to Nice or Naughty ($\chi^2(1)=.06$, $p=1$; $\chi^2(1)=.10$, $p=.82$, respectively), nor were there any differences in positive donations to Nice or Naughty ($U=319.00$, $p=.40$; $U=214.50$, $p=.74$, respectively). Data were therefore collapsed across order for subsequent analyses.

Analyses revealed a robust effect of deservingness upon children's donations in the DG. Wilcoxon analyses showed that children donated significantly more overall to Nice than to Naughty ($z=-3.33$, $p=.001$; see Figure 5.2). A McNemar test using binomial distribution revealed a significant effect of deservingness on the decision to donate ($n=75$, $p=.01$); 76% of the children were consistent across conditions in their donation decision, either giving nothing to both Nice and Naughty (22.67%) or making a donation to both (53.33%). Of those who were inconsistent, 83.33% chose to donate to Nice but not Naughty, while only 16.67% donated to Naughty but not Nice (see Figure 5.3 for percentages of children choosing to donate in each condition). Children also made larger positive donations to Nice than to Naughty (Wilcoxon; $z=-2.34$, $p=.02$; see Figure 5.4).

When children made their sticker selections they were asked to choose their favourite each time. The first five stickers chosen were therefore coded as their most preferred and the final five their least preferred. The proportion of stickers donated that were most preferred were then compared to the proportion of stickers donated that were least preferred for each condition. Wilcoxon analyses revealed that children donated more of their least liked stickers than their most liked stickers to both Nice ($z=-3.69$, $p<.001$) and Naughty ($z=-4.39$, $p<.001$). When comparing across deservingness, children donated significantly more of their most preferred stickers to Nice than Naughty and more of their least preferred stickers to Naughty than Nice ($z=-2.02$, $p=.04$).

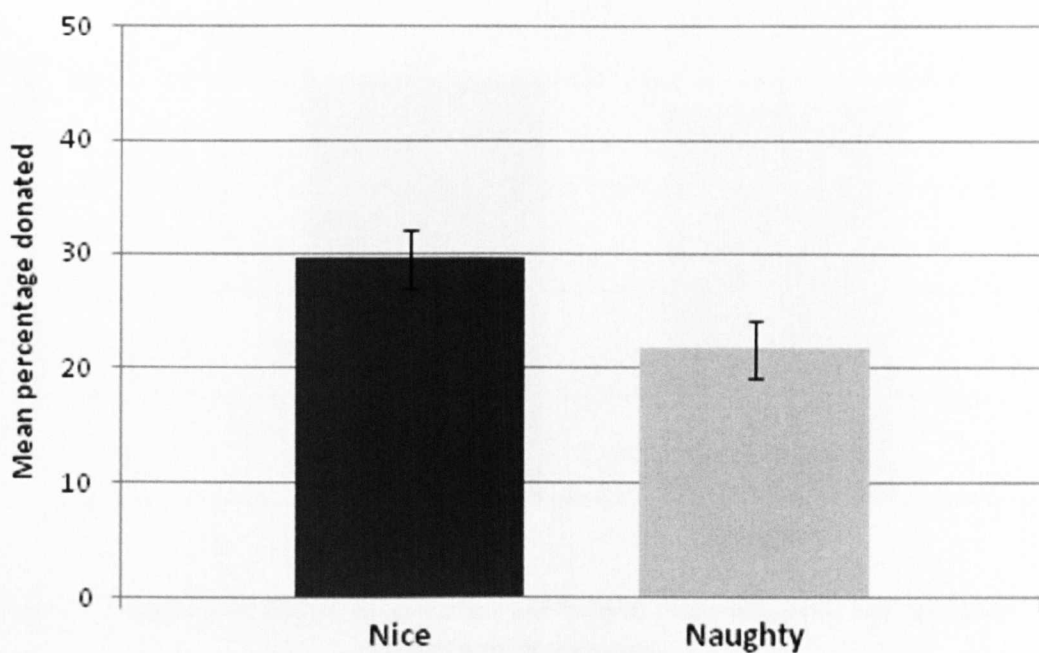


Figure 5.2: Mean percentage donated overall in the Nice and Naughty treatments (error bars represent standard error of the mean)

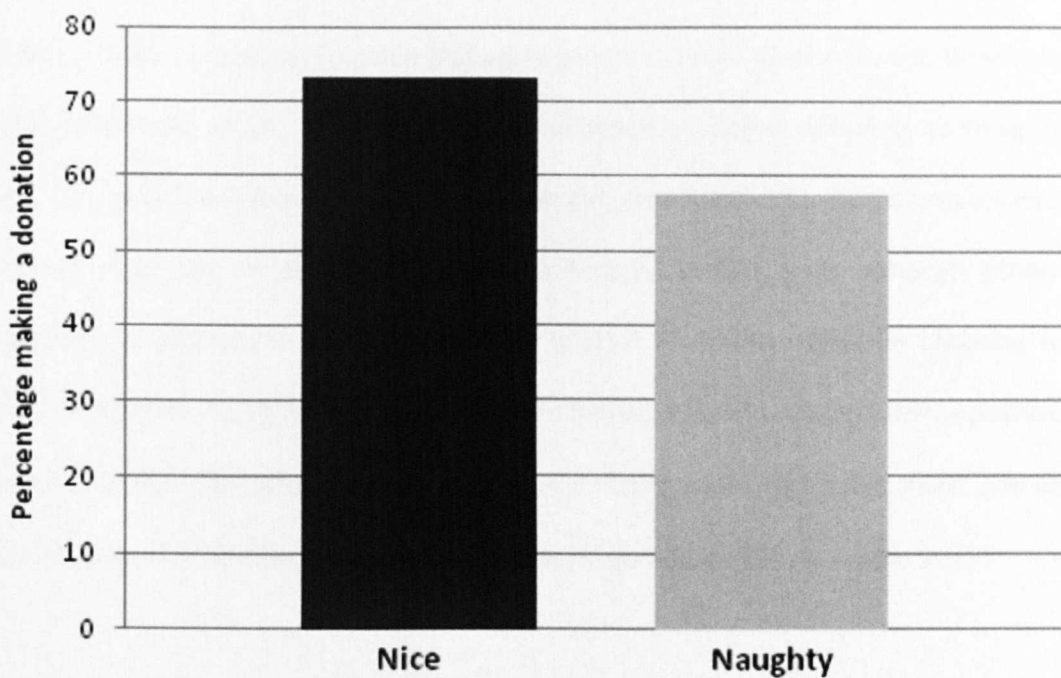


Figure 5.3: Percentage of participants choosing to make a donation in the Nice and Naughty treatments

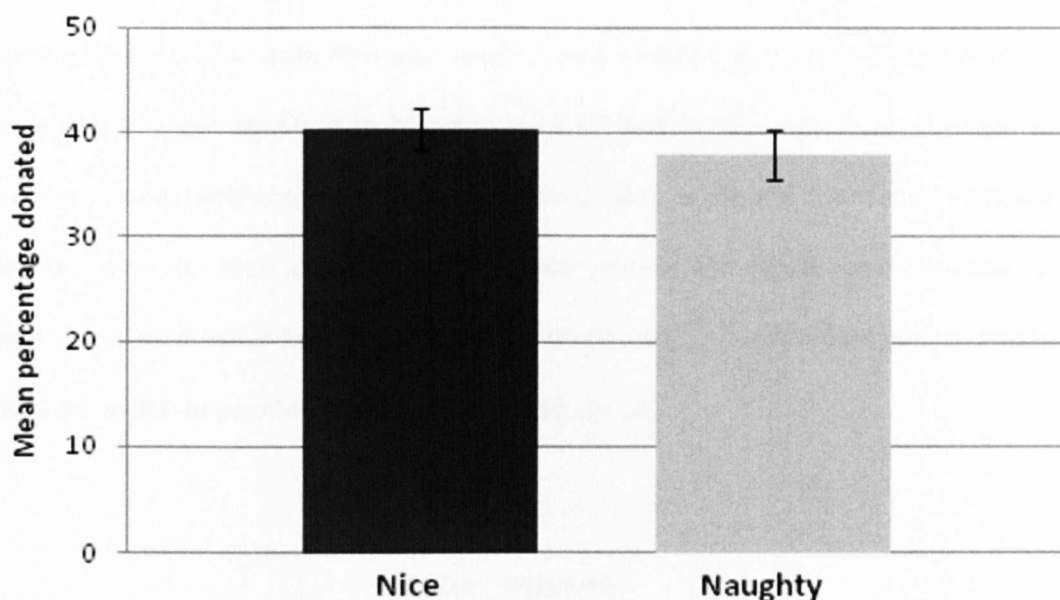


Figure 5.4: Mean positive donation in the Nice and Naughty treatments (error bars represent standard error of the mean)

5.3.1.1 Gender

Data were analysed to assess the impact of gender upon donations in the Deservingness DG. Mann-Whitney analyses revealed that while gender did not influence overall donations to Nice ($U=571.00$, $p=.16$), it had a significant influence on overall donations to Naughty ($U=521.00$, $p=.05$), with boys donating more than girls (see Figure 5.5). Chi-squares showed no effect of gender on decision to donate to Nice ($\chi^2(1)=0.03$, $p=1$), although gender influenced the decision to donate to Naughty ($\chi^2(1)=5.33$, $p=.04$) with boys choosing to donate more often than girls (see Figure 5.6). Gender had a significant effect on the positive donations to Nice ($U=260.50$, $p=.04$), with boys donating more than girls; there was no effect of gender on positive donations to Naughty ($U=219.00$, $p=.89$; see Figure 5.7).

In order to make a direct gender comparison of the extent to which children modulated their donations according to deservingness, a difference score was calculated by subtracting each child's donation to Naughty from their donation to Nice for overall

donations, the decision to donate and positive donations. For positive donations, only children who donated to both Nice and Naughty were included. A negative score therefore represented a larger donation to Naughty than to Nice, a zero score represented no difference in donations according to deservingness, while a positive score represented a larger donation to Nice than to Naughty. No gender difference was observed in deservingness modulation for overall donations ($U=640.50, p=.52$), the decision to donate ($\chi^2(2)=0.36, p=.83$) or positive donations ($U=156.50, p=.28$).

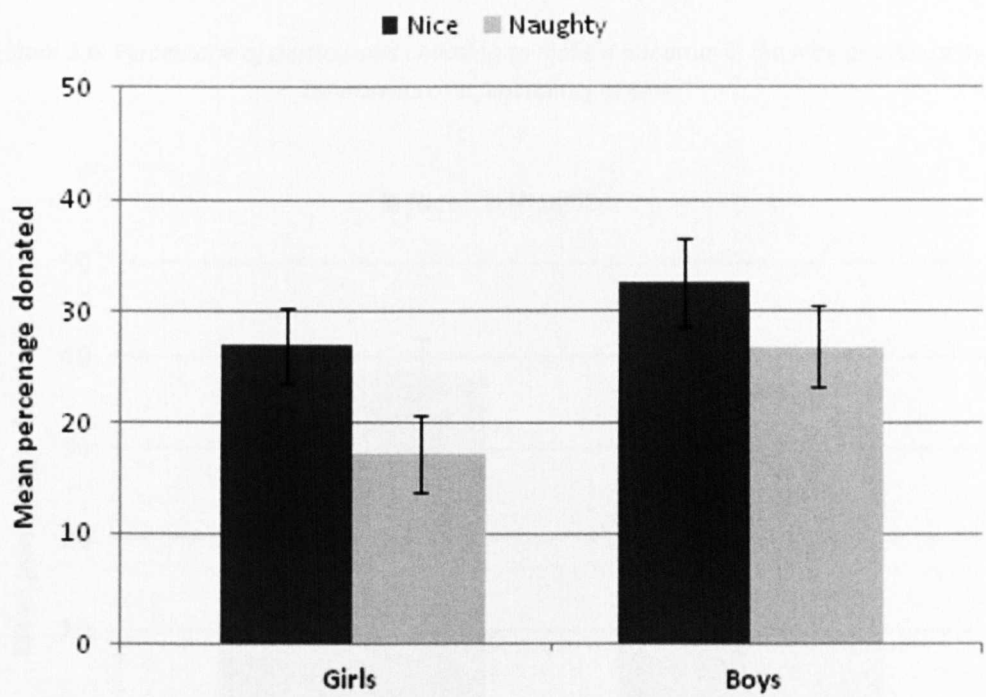


Figure 5.5: Mean percentage donated overall in the Nice and Naughty treatments as a function of gender (error bars represent standard error of the mean)

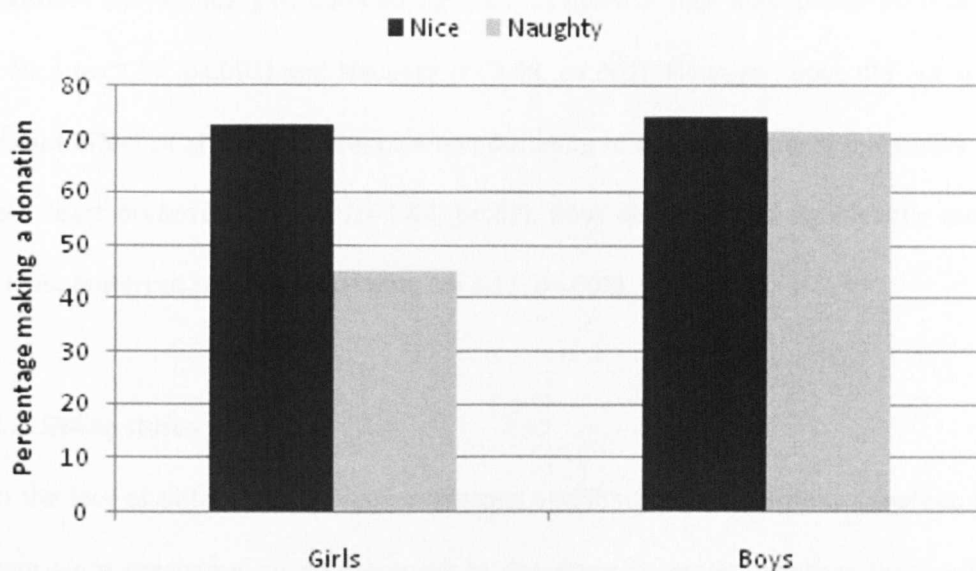


Figure 5.6: Percentage of participants choosing to make a donation in the Nice and Naughty treatments as a function of gender

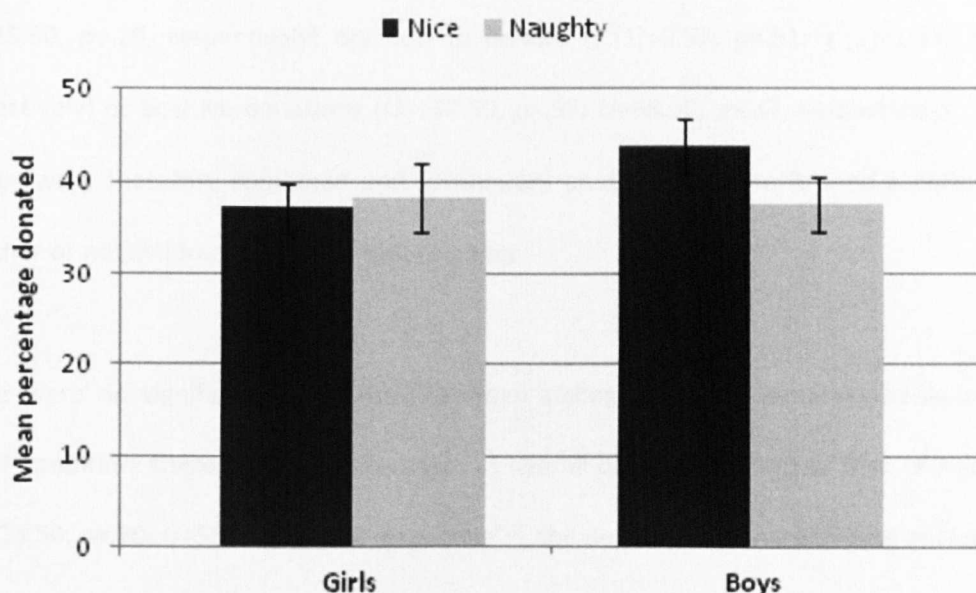


Figure 5.7: Mean positive donation in the Nice and Naughty treatments as a function of gender (error bars represent standard error of the mean)

The impact of sticker preference according to gender was also assessed. When directly comparing across boys and girls, there were no differences in the proportion of donations that were most or least liked for either Nice ($U=302.50$, $p=.21$) or Naughty ($U=199.50$, $p=.53$). When comparing the proportion of most and least preferred stickers donated for

each gender individually, girls donated significantly more of their least preferred stickers to both Nice ($z=3.37, p<.001$) and Naughty ($z=3.08, p=.001$). However, boys did not show a significant effect of sticker preference when donating to Nice, giving only marginally more of their least preferred stickers ($z=1.82, p=.07$). Boys also donated significantly more of their least preferred stickers to Naughty ($z=3.11, p=.001$).

5.3.1.2 Sibling status

Given the lack of difference between singletons and firstborns in previous chapters, these children were compared on all measures of donations to assess whether they could be grouped together as children without older siblings. There were no differences for either the Nice condition or the Naughty condition in overall donation profiles ($U=230.50, p=.36$; $U=225.50, p=.29$, respectively) decision to donate ($\chi^2(1)=0.57, p=.51$; $\chi^2(1)=1.63, p=.25$, respectively) or positive donations ($U=140.50, p=.58$; $U=68.50, p=.87$, respectively). These groups were therefore combined and subsequent analyses were performed according to whether or not children possessed older siblings.

There were no significant differences between sibling groups in donation behaviour in either condition: there were no differences in overall donations to either Nice or Naughty ($U=623.50, p=.70$; $U=557.00, p=.25$, respectively), the decision to donate to Nice or Naughty ($\chi^2(1)=0.69, p=.43$; $\chi^2(1)=0.88, p=.47$, respectively), or positive donations to Nice or Naughty ($U=319.00, p=.68$; $U=197.00, p=.49$, respectively).

When modulation according to deservingness (difference scores) was compared to according to possession of older siblings, the same null pattern emerged with no differences in overall donations ($U=570.00, p=.32$), the decision to donate ($\chi^2(2)=1.95, p=.38$) or positive donations ($U=169.0, p=.52$).

The impact of sticker preference was also assessed according to the possession of older siblings. When directly comparing across possession of older siblings, there were no differences in the proportion of donations that were most or least liked for either Nice ($U=314.50, p=.62$) or Naughty ($U=195.00, p=.46$). When comparing the proportion of most and least preferred stickers donated for each sibling group individually, children without older siblings donated significantly more of their least preferred stickers to both Nice ($z=3.29, p=.001$) and Naughty ($z=3.72, p<.001$). However, children with older siblings did not show a significant effect of sticker preference when donating to Nice ($z=1.68, p=.09$), although they showed a trend towards giving more of their least preferred stickers; children with older siblings also donated significantly more of their least preferred stickers to Naughty ($z=2.32, p=.02$).

5.3.1.3 Confounding variables

Table 5.5 shows descriptive statistics for maths and ToM ability by sibling status, For the group as a whole the maths equal division and same/more tasks were found to be significantly correlated ($r_s=.51, p<.001$). For ToM, 68.00% of children were consistent in their response on the deceptive box task and Sally/Anne task (see Table 5.4). Of those who were inconsistent, children were equally likely to pass the Sally-Anne task (54.17%) as the deceptive box task (45.83%; McNemar $\chi^2 p=.20$).

Table 5.4: Consistency table showing the number of children in the group as a whole passing and failing the two ToM tasks

	Fail Sally-Anne	Pass Sally-Anne
Fail Deceptive box	32	13
Pass Deceptive box	11	19

Table 5.5: Maths and ToM ability in the Deservingness DG across sibling groups (standard deviations in parentheses; ranges in italics)

		Singletons	Firstborns	Lastborns	Group differences
Maths tasks	Equal division task (mean score/6)	5.76 (.77) <i>3-6</i>	5.62 (1.10) <i>2-6</i>	5.36 (.99) <i>3-6</i>	$H(2)=5.39, p=.07$
	Same/more task (mean score/24)	23.19 (1.60) <i>18-24</i>	23.08 (2.18) <i>16-24</i>	22.14 (3.42) <i>11-24</i>	$H(2)=3.00, p=.22$
	Composite maths (mean score/30)	28.95 (2.18) <i>21-30</i>	28.68 (3.21) <i>19-30</i>	27.50 (3.89) <i>15-30</i>	$H(2)=7.11, p=.03$
ToM tasks	Deceptive box task (pass rate)	.48 (.51)	.38 (.50)	.36 (.49)	$\chi^2(2)=0.75, p=.73$
	Sally/Anne task (pass rate)	.33 (.48)	.38 (.50)	.54 (.51)	$\chi^2(2)=2.79, p=.28$
	Composite ToM score (mean score/2)	.81 (.81) <i>0-2</i>	.77 (.82) <i>0-2</i>	.89 (.83) <i>0-2</i>	$H(2)=2.27, p=.32$

Correlations were conducted to examine whether any potential confounding variables influenced donation behaviour (see Table 5.6). As there was a significant correlation between the maths tasks and there was no significant difference between the frequency of passing the two ToM tasks, composite scores were entered into the correlations rather than individual scores. There was a significant relationship between SES and positive donations to Nice ($r_s=.29, p=.03$) and a marginal effect in the same direction towards Naughty ($r=.28, p=.07$), with donations increasing as SES increased. No other variables had a significant influence upon donation behaviour ($p>.05$).

Table 5.6: Relationships between potential predictor variables and donations to Nice, donations to Naughty and difference scores

Overall donation profile	Nice	Naughty	Difference score (Nice-Naughty)
Maths composite score	$r_s=.12, p=.33$	$r_s=-.05, p=.68$	$r_s=.11, p=.37$
Time with peers	$r_s=-.07, p=.55$	$r_s=.04, p=.76$	$r_s=-.01, p=.94$
SES	$r_s=.06, p=.60$	$r_s=.04, p=.71$	$r_s=.03, p=.83$
ToM composite score	$r_s=.04, p=.76$	$r_s=-.04, p=.71$	$r_s=.08, p=.51$
Decision to donate	Nice	Naughty	Difference score (Nice-Naughty)
Maths composite score	$r_{pb}=.15, p=.20$	$r_{pb}=.02, p=.85$	$r_s=.05, p=.68$
Time with peers	$r_{pb}=.08, p=.48$	$r_{pb}=.10, p=.41$	$r_s=.04, p=.76$
SES	$r_{pb}=-.11, p=.33$	$r_{pb}=-.03, p=.81$	$r_s=-.04, p=.75$
ToM composite score	$r_{pb}=.02, p=.87$	$r_{pb}=-.02, p=.88$	$r_s=-.04, p=.71$
Positive donations	Nice	Naughty	Difference score (Nice-Naughty)
Maths composite score	$r_s=.03, p=.84$	$r=-.09, p=.58$	$r_s=.09, p=.59$
Time with peers	$r_s=-.14, p=.30$	$r=-.06, p=.69$	$r_s=.04, p=.76$
SES	$r_s=.29, p=.03$	$r=.28, p=.07$	$r_s=.10, p=.56$
ToM composite score	$r_s=.04, p=.79$	$r=-.07, p=.66$	$r_s=-.04, p=.71$

Given that the only correlation that reached significance in Table 5.6 was between positive donations to Nice and SES, a simultaneous multiple regression was conducted in order to establish whether SES might be a confounding variable accounting for the gender effect described earlier on the size of positive donations to Nice (see section 5.3.1.1; no other regressions were conducted as no other significant relationships with potential predictor variables were observed). As such, gender and SES were entered as predictor variables, with positive donations to Nice as the dependent variable. A significant model was not produced ($F_{2,52}=2.04$, $\Delta R^2=.07$, $p=.14$) and neither variable emerged as a significant predictor; coefficients are summarised in Table 5.7. The gender effect observed on the positive donations to Nice may therefore be an artefact of an SES imbalance across the girls and boys. However, the absence of a significant correlation between SES and donations to Naughty suggests that the gender effect observed in those conditions cannot be accounted for by SES.

Table 5.7: Summary of multiple regression analysis for variables predicting positive donations to Nice (n=54)

	B (SE)	Significance	95% CI for B
Constant	3.42 (0.39)	<.001	2.64-4.20
Gender	0.55 (0.40)	.18	0.26-1.35
SES	0.01 (0.01)	.29	0.01-0.03

5.3.2 Possession of information

Data were compared to those from the Classic DG in order to examine how possession of information about the recipient, whether positive or negative, influences donation behaviour. Means and standard deviations for the Classic DG can be found in Table 4.2. Figure 5.8 shows the distributions of donations in the Classic DG and the Deservingness DG.

Overall, possession of both positive and negative information increased donations as children donated significantly less in the Classic DG than in both the Nice and Naughty conditions (Mann-Whitney, $U=1247.50$, $p<.001$; $U=1658.00$, $p=.03$, respectively; see Figure 5.9). Chi-square analyses revealed that the decision to donate was also influenced by possession of both positive and negative information ($\chi^2(1)=15.34$, $p<.001$; $\chi^2(1)=4.18$, $p=.05$, respectively; see Figure 5.10). Positive donations, however, were not influenced by the possession of either positive or negative information ($U=467.50$, $p=.11$; $U=410.00$, $p=.38$, respectively).

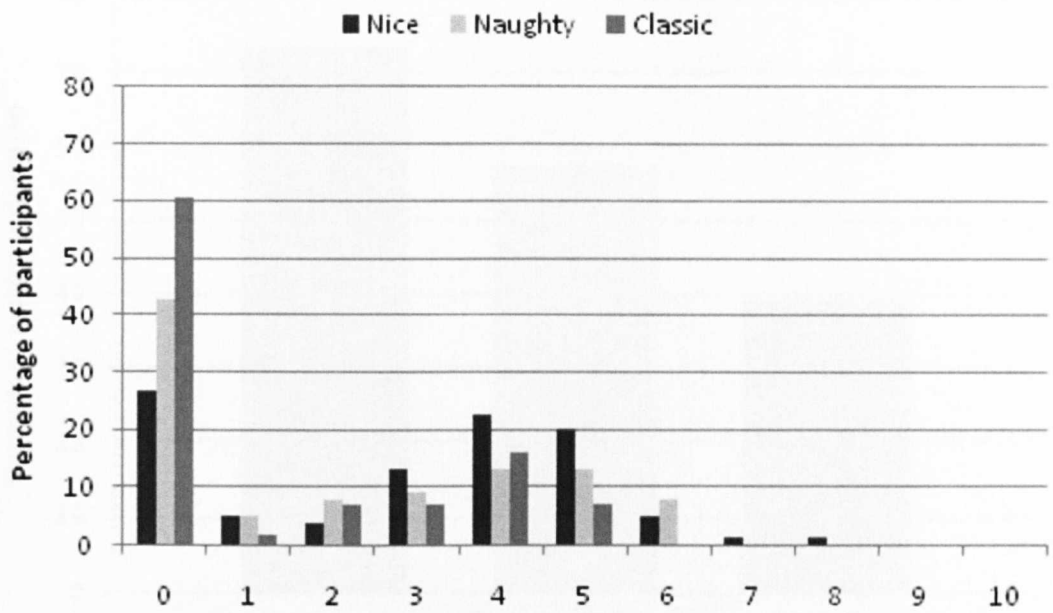


Figure 5.8: Donation distributions in the Nice, Naughty and Classic treatments

The influence of possession of information on the proportion of most or least preferred stickers donated was also examined, with no difference in proportion donated according to preference when possessing either positive or negative information ($U=602.00$, $p=.98$; $U=416.50$, $p=.43$, respectively).

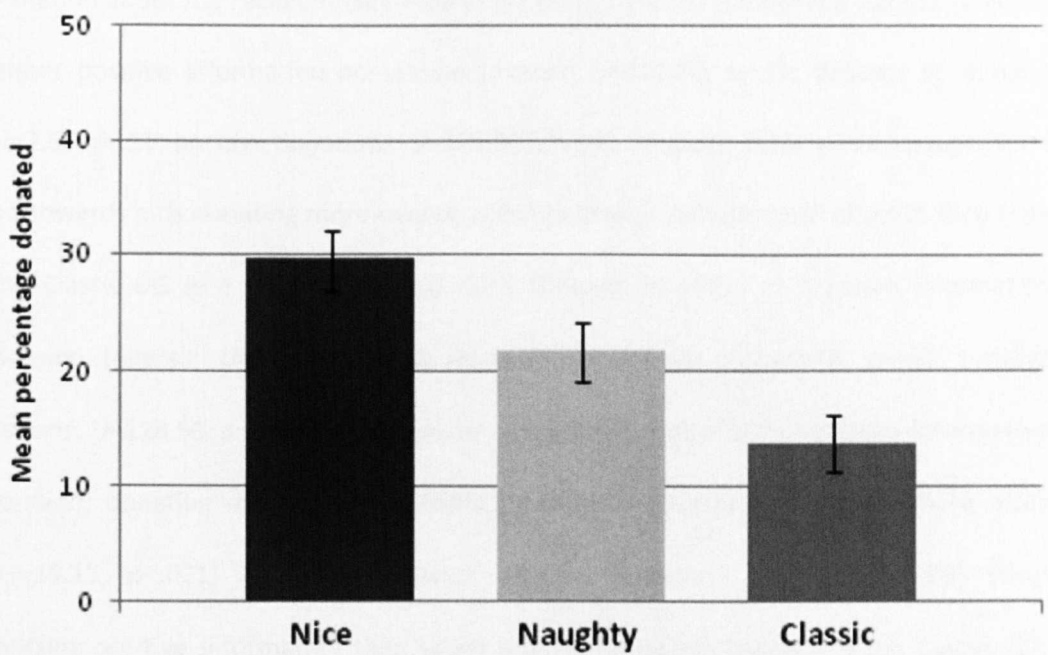


Figure 5.9: Mean percentage donated overall in the Nice, Naughty and Classic treatments (error bars represent standard error of the mean)

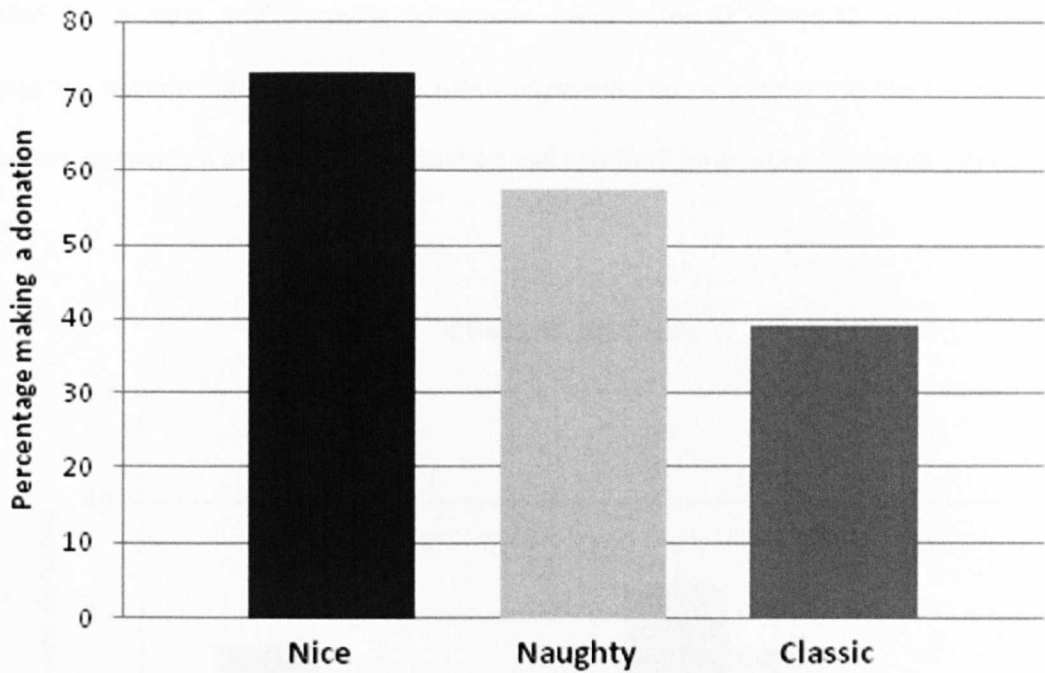


Figure 5.10: Percentage of participants choosing to make a donation in the Nice, Naughty and Classic treatments

5.3.2.1 Gender

In order to assess whether gender influences the effect of information possession, analyses were also conducted individually by gender examining the influence of possessing information about the recipient (see Figures 5.11-13). Girls did not show a significant effect of either positive information possession (overall: $U=446.00$, $p=.15$; decision to donate: $\chi^2(1)=2.58$, $p=.13$; positive donations: $U=209.50$, $p=.84$), although there was a nonsignificant trend towards girls donating more overall and choosing to donate more often to Nice than in the Classic DG (see Figures 5.11-12). Girls showed no effect of negative information possession (overall: $U=528.50$, $p=.68$; decision to donate: $\chi^2(1)=0.48$, $p=.62$; positive donations: $U=118.50$, $p=.55$). Boys, however, showed a strong effect of positive information possession, donating more overall ($U=200.50$, $p<.001$), choosing to donate more often ($\chi^2(1)=15.15$, $p<.001$) and making larger positive donations ($U=43.00$, $p=.03$) when possessing positive information than when possessing no information in the Classic DG. Boys were also influenced by possession of negative information, donating more overall

($U=246.00$, $p<.001$) and choosing to donate more often ($\chi^2(1)=13.42$, $p<.001$) when possessing negative information than when possessing no information in the Classic DG. However, possession of negative information had no effect on positive donations ($U=71.00$, $p=.48$).

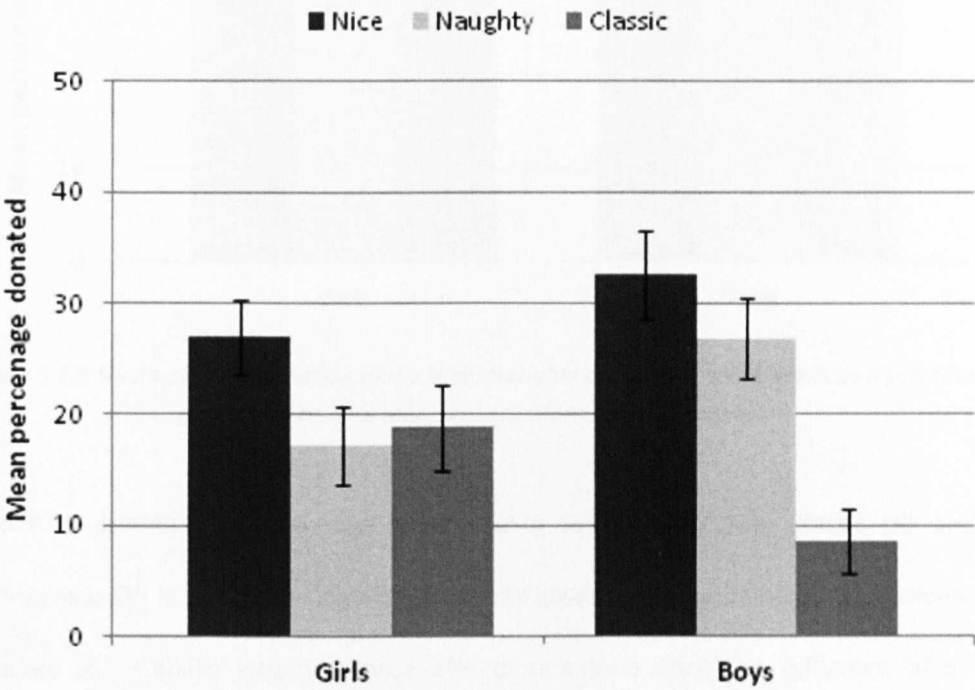


Figure 5.11: Mean percentage donated overall in the Nice, Naughty and Classic treatments as a function of gender (error bars represent standard error of the mean)

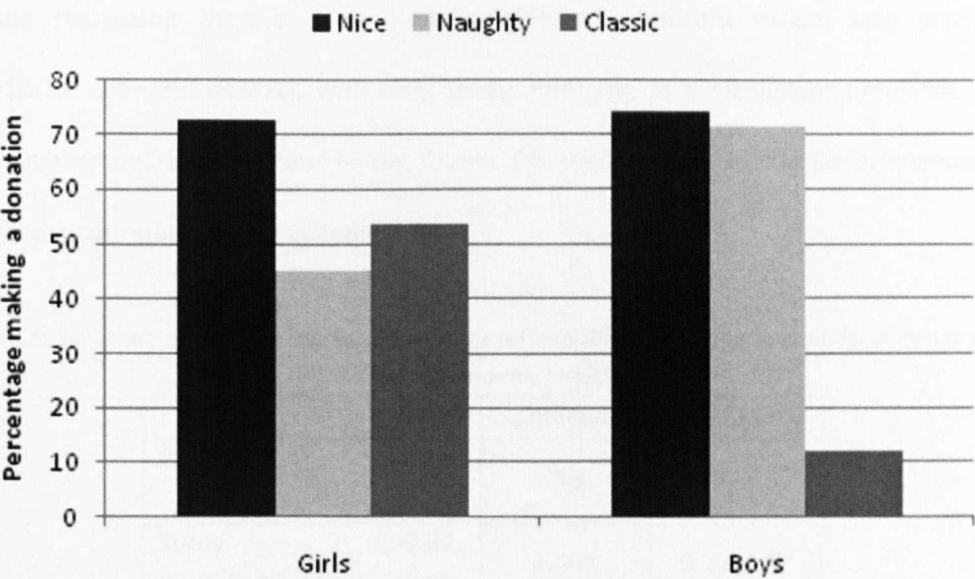


Figure 5.12: Percentage of participants choosing to make a donation in the Nice, Naughty and Classic treatments as a function of gender

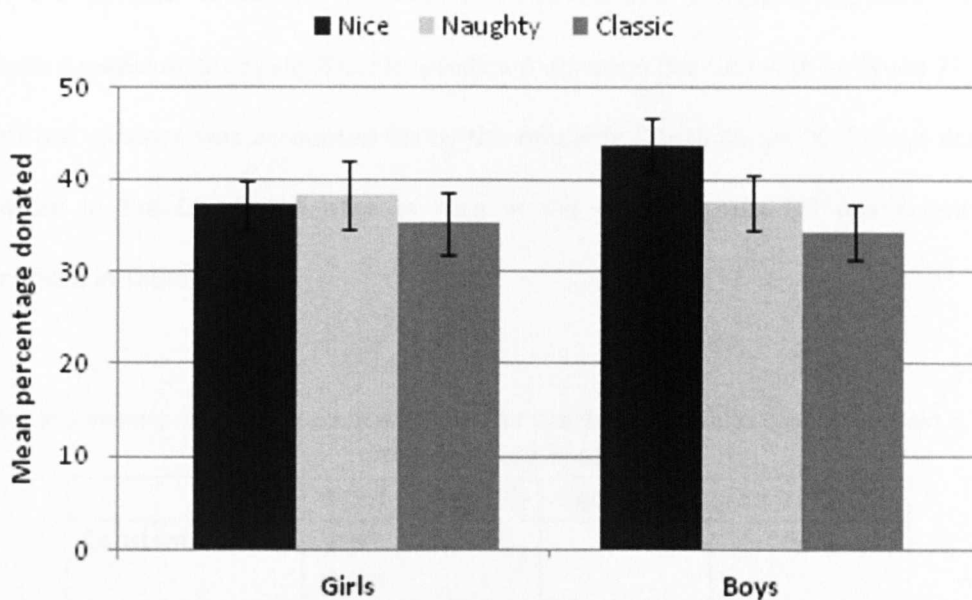


Figure 5.13: Mean positive donation in the Nice, Naughty and Classic treatments as a function of gender (error bars represent standard error of the mean)

In order to ascertain whether the difference in SES between the Classic DG and the Deservingness DG is driving the significant effects observed above in boys, regressions were conducted to establish whether these effects remained once the influence of SS was controlled. In each case, ‘Study’ (i.e. Classic DG or Deservingness DG) and SES were entered as predictor variables. When overall donations to Nice were entered into a simultaneous multiple regression as the dependent variable, a significant model was produced ($F_{2,59}=10.35$, $\Delta R^2=.26$, $p<.001$), with only Study emerging as a significant predictor: boys made smaller overall donations in the Classic DG than to Nice in the Deservingness DG (coefficients are summarised in Table 5.8).

Table 5.8: Summary of multiple regression analysis for variables predicting overall donations in boys (Nice treatment; $n=62$)

	B (SE)	Significance	95% CI for B
Constant	0.58 (0.99)	.56	1.40-2.57
Study (Classic DG, Nice)	0.57 (0.15)	<.001	0.27-0.87
SES	0.004 (0.01)	.74	0.03-0.02

When the decision to donate to Nice was entered into a logistic regression as the dependent measure, Study significantly predicted donation decision with between 23% and 31% of the variance was accounted for by the model ($\chi^2(2)=16.46, p<.001$); boys donated less often in the Classic DG than to Nice in the Deservingness DG (coefficients are summarised in Table 5.9).

Table 5.9: Summary of logistic regression analysis for variables predicting donation decision in boys (Nice treatment; n=62)

	B (SE)	Wald (df)	Significance	Exp b (95% CI)
Constant	1.80 (0.74)	6.01 (1)	.01	6.06
Study (Classic DG, Nice)	-1.78 (0.63)	7.91 (1)	.01	1.69 (0.05-0.58)
SES	-0.02 (0.01)	1.55 (1)	.21	0.99 (0.96-1.01)

When positive donations to Nice were entered into a simultaneous multiple regression as the dependent variable, a significant model was not produced ($F_{2,30}=2.37, \Delta R^2=.14, p=.11$), with no variables emerging as significant predictors, although there was a trend towards boys making smaller overall donations in the Classic DG than to Nice in the Deservingness DG (coefficients are summarised in Table 5.10).

Table 5.10: Summary of multiple regression analysis for variables predicting positive donations in boys (Nice treatment; n=33)

	B (SE)	Significance	95% CI for B
Constant	2.35 (0.88)	.01	0.54-4.15
Study (Classic DG, Nice)	0.29 (0.15)	.06	-0.01-0.59
SES	0.01 (0.01)	.18	-0.01-0.04

When overall donations to Naughty were entered into a simultaneous multiple regression as the dependent variable, a significant model was produced ($F_{2,59}=6.58$, $\Delta R^2=.18$, $p=.003$), with only Study emerging as a significant predictor: boys made smaller overall donations in the Classic DG than to Naughty in the Deservingness DG (coefficients are summarised in Table 5.11).

Table 5.11: Summary of multiple regression analysis for variables predicting overall donations in boys (Naughty treatment; n=62)

	<i>B (SE)</i>	Significance	95% CI for <i>B</i>
Constant	0.21 (0.94)	.83	-1.68-2.09
Study (Classic DG, Naughty)	0.47 (0.14)	.002	0.19-0.75
SES	0.003 (0.01)	.77	-0.02-0.02

When the decision to donate to Naughty was entered into a logistic regression as the dependent measure, Study significantly predicted donation decision with between 19% and 26% of the variance accounted for by the model ($\chi^2(2)=13.24$, $p=.001$); boys donated less often in the Classic DG than to Naughty in the Deservingness DG (coefficients are summarised in Table 5.12).

Table 5.12: Summary of logistic regression analysis for variables predicting donation decision in boys (Naughty treatment; n=62)

	<i>B (SE)</i>	Wald (df)	Significance	Exp <i>b</i> (95% CI)
Constant	1.12 (0.68)	2.74 (1)	.10	3.07
Study (Classic DG, Naughty)	-1.86 (0.64)	8.37 (1)	.004	0.16 (0.04-0.55)
SES	-0.004 (0.01)	0.13 (1)	.71	1.00 (0.97-1.02)

Thus, these findings confirm that even when SES is controlled, information possession remains a significant influence on boys' overall donations and the decision to donate, while the influence of SES disappears.

The influence of possession of information on the proportion of most or least preferred stickers donated was also examined independently for gender. Compared to the Classic DG, girls did not show a significant difference in the proportion of most or least preferred stickers donated when possessing either positive or negative information ($U=178.00$, $p=.38$; $U=97.50$, $p=.17$, respectively); this was also the case for boys ($U=66.00$, $p=.27$; $U=74.00$, $p=.55$, respectively).

5.3.2.2 Sibling status

The possession of information effect was also examined independently according to sibling status (see Figures 5.14-5.16). Children without older siblings were found to give significantly more overall when possessing positive information ($U=427.00$, $p<.001$) and marginally more when possessing negative information ($U=670.50$, $p=.08$). Similarly, they chose to donate significantly more often when in possession positive information ($\chi^2(1)=15.65$, $p<.001$) and marginally more often when in possession of negative information ($\chi^2(1)=3.25$, $p=.08$). Positive donations were not affected by either positive or negative information ($U=163.00$, $p=.19$; $U=142.50$, $p=.83$, respectively). For children with older siblings, there was no effect of possession of positive information (overall donations: $U=207.50$, $p=.12$; decision to donate $\chi^2(1)=1.56$, $p=.25$; positive donations: $U=72.50$, $p=.30$) or possession of negative information (overall donations: $U=223.00$, $p=.22$; decision to donate: $\chi^2(1)=0.98$, $p=.38$; positive donations: $U=73.00$, $p=.42$).

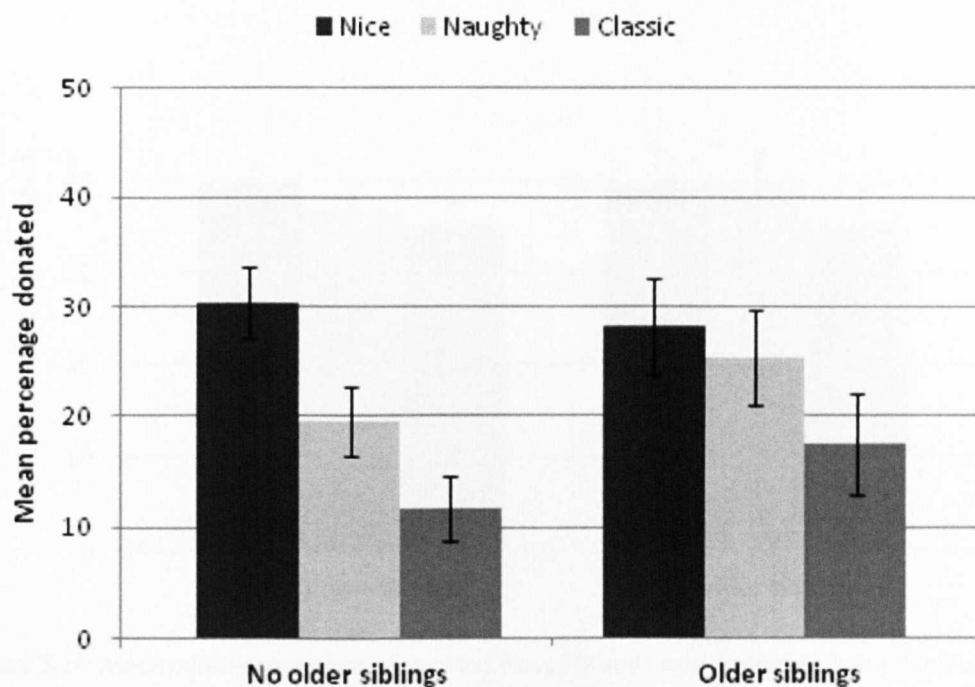


Figure 5.14: Mean percentage donated overall in the Nice, Naughty and Classic treatments as a function of sibling status (error bars represent standard error of the mean)

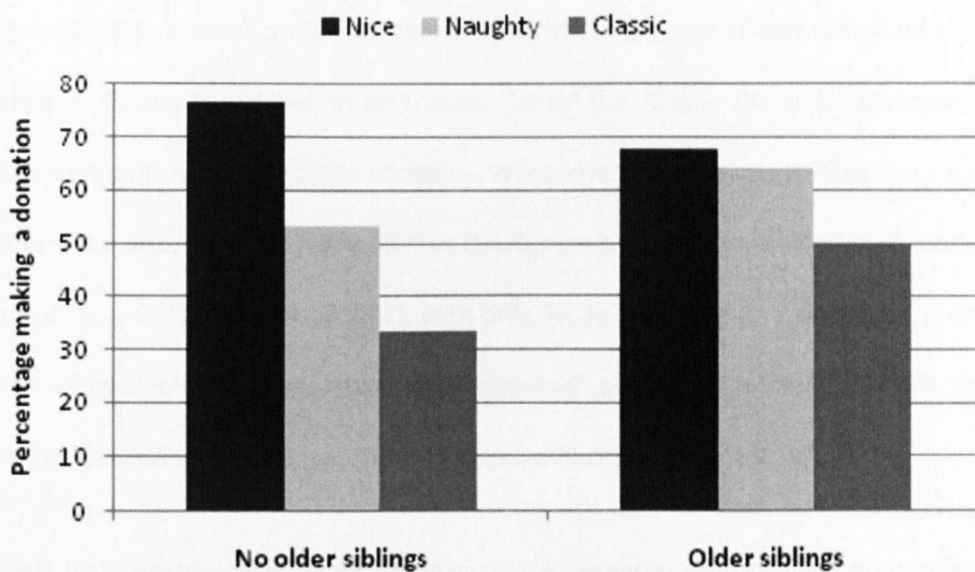


Figure 5.15: Percentage of participants choosing to make a donation in the Nice, Naughty and Classic treatments as a function of sibling status

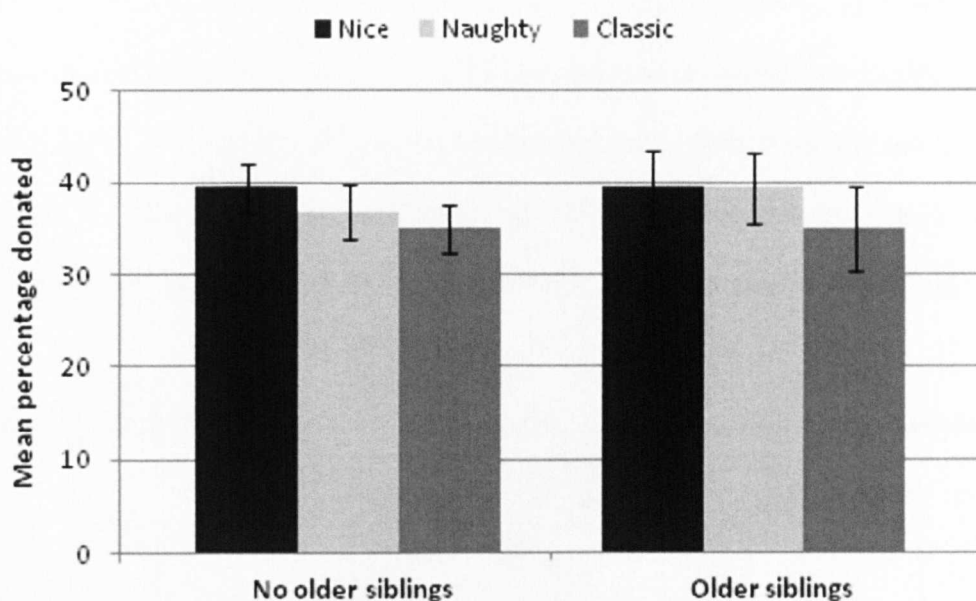


Figure 5.16: Mean positive donations in the Nice, Naughty and Classic treatments as a function of sibling status (error bars represent standard error of the mean)

In order to ascertain whether the difference in SES between the Classic DG and the Deservingness DG is driving the significant effects observed above in children without older siblings, regressions were conducted to establish whether these effects remained once the influence of SS was controlled. In each case, ‘Study’ (i.e. Classic DG or Deservingness DG) and SES were entered as predictor variables. When overall donations to Nice were entered into a simultaneous multiple regression as the dependent variable, a significant model was produced ($F_{2,79}=9.25$, $\Delta R^2=.19$, $p<.001$), with only Study emerging as a significant predictor: children without older siblings made smaller overall donations in the Classic DG than to Nice in the Deservingness DG (coefficients are summarised in Table 5.13).

Table 5.13: Summary of multiple regression analysis for variables predicting overall donations in children without older siblings (Nice treatment; $n=82$)

	B (SE)	Significance	95% CI for B
Constant	1.55 (0.83)	.07	-.11-3.21
Study (Classic DG, Nice)	0.38 (0.13)	.006	0.11-0.64
SES	-.01 (0.01)	.26	-.03-0.01

When the decision to donate to Nice was entered into a logistic regression as the dependent measure, Study significantly predicted donation decision between 20% and 27% of the variance accounted for by the model ($\chi^2(2)=18.63, p<.001$); boys donated less often in the Classic DG than to Nice in the Deservingness DG, while there was a trend towards children who donate having a higher SES (coefficients are summarised in Table 5.14).

Table 5.14: Summary of logistic regression analysis for variables predicting donation decision in children without older siblings (Nice treatment; n=82)

	<i>B (SE)</i>	Wald (df)	Significance	Exp <i>b</i> (95% CI)
Constant	1.96 (0.57)	11.99 (1)	.001	7.13
Study (Classic DG, Nice)	-1.31 (0.56)	5.41 (1)	.02	0.27 (0.09-0.81)
SES	-0.02 (0.01)	3.43 (1)	.06	0.99 (0.96-1.00)

Thus, these findings confirm that even when SES is controlled, information possession remains a significant influence on the overall donations and the decision to donate of children without older siblings. The influence of SES disappeared in overall donations, while a trend remained with the decision to donate, with higher SES children donating more often.

The influence of possession of information on the proportion of most or least preferred stickers donated was also examined independently for sibling status. Compared to the Classic DG, children without older siblings did not show a significant difference in the proportion of most or least preferred stickers donated when possessing either positive or negative information ($U=209.00, p=.87$; $U=123.50, p=.39$, respectively); this was also the case for children with older siblings ($U=89.00, p=.79$; $U=86.00, p=.86$, respectively).

5.3.3 Summary of results

All children could discriminate between Nice and Naughty and when there was no personal cost the majority of children thought that Nice was more deserving of reward than Naughty. This was reflected in DG donations, with children demonstrating a robust effect of deservingness. Children donated more overall, chose to donate more often, and made larger positive donations to Nice than to Naughty. When examined by gender, there were no differences in donations to Nice for overall donations and the decision to donate, but boys made larger positive donations than girls. This effect did not remain significant once SES was controlled. Boys donated more overall and chose to donate more often to Naughty than did girls, but there were no differences in positive donations. However, gender did not influence modulation of donations according to deservingness as assessed by a difference score between donations to Nice and Naughty. Sibling status did not influence donation behaviour to either Nice or Naughty or modulation of donations according to deservingness. SES was positively correlated with positive donations to Nice, although this did not remain significant once the effect of gender was controlled. No other potential predictor variables influenced donations to either Nice or Naughty or the modulation of donations according to deservingness. Children consistently donated more of their least preferred stickers to both Nice and Naughty, although this effect did not quite reach significance for both boys and children with older siblings when donating to Nice.

When data were compared to the Classic DG to examine the influence of possessing information about the recipient, both overall donations and the frequency of donations were increased by possession of information, whether positive or negative. Positive donations were not influenced by possession of positive or negative information. Furthermore, girls and boys showed different effects of information possession. Girls' donations were not significantly influenced by the possession of either positive or negative

information about the recipient, although there was a nonsignificant trend towards girls donating more overall and choosing to donate more often when possessing positive information. Boys' overall donations and frequency of donation were increased by the possession of both positive and negative information, although only positive information increased the size of boys' positive donations. The effects of information possession upon boys' overall donations to both Nice and Naughty and upon the decision to donate to both Nice and Naughty remained when SES was controlled, but the influence of positive information possession upon positive donations did not remain once SES was controlled. Different effects of possession of information were also observed according to sibling status. Children without older siblings gave more overall and chose to donate more often when possessing both positive and negative information, although the effects did not quite reach significance for negative information (positive donations were not affected); this effect of positive information on overall donations and the decision to donate remained even when SES was controlled. The donations of children with older siblings, however, did not differ from those in the Classic DG when possessing either positive or negative information. Possession of information did not influence the proportion of most preferred stickers donated for the group as a whole, or according to gender or sibling status.

5.4 Discussion

The current study examined how 4-5 year-olds' DG donations are influenced by information about recipients' reputations. It has demonstrated that young children are able to factor in the valence of reputation information when dividing their endowments, donating more to a 'nice' child than to a 'naughty' child. Children are also influenced by the possession of information, donating more to both Nice and Naughty than in the Classic DG. While boys appeared to be more influenced by the possession of information (both positive and negative) than girls, and children without older siblings were more influenced by the possession of positive information than those with older siblings, other confounding variables had little effect upon donations.

5.4.1 Reputation

Consistent with our prediction, children's donations were influenced by the reputation of the recipient. A robust effect of deservingness was observed, with children donating more to Nice than to Naughty across all measures. Positive and negative recipient attributes have not previously been directly compared with the DG in either children or adults, but this finding is consistent with the fact that adults donate more to more worthy recipients (Eckel & Grossman, 1996) and less to less worthy recipients (Fong, 2007; Fong & Luttmer, 2010; Fong & Oberholzer-Gee, 2011). Children are not just aware of the norm of reciprocity (Olson & Spelke, 2008): the present study has demonstrated that they are also able to use reputational information to inform their own indirect reciprocity. While children favour Nice with a larger proportion of their most preferred stickers than that given to Naughty, they nonetheless seem to be strategic in their implementation of the reciprocity norm, minimising the impact to themselves by consistently donating a greater proportion of their least preferred stickers than most preferred stickers to both Nice and Naughty, irrespective of gender or sibling status.

When there was no personal cost the majority of children thought that Nice was more deserving of reward than Naughty. When it is down to the child to provide the reward (and this is costly to the child) a larger proportion of children would be expected to behave selfishly to Nice, especially under conditions of anonymity. This was confirmed, with 3% of children stating that Nice should not go on the school trip but 26% choosing not to donate. It is interesting therefore that while 97% of children stated that Naughty should not be allowed to go on a school trip, only 57% of children implemented this by not allocating any stickers. There are two potential explanations for this pattern of results. The children may have exhibited a social desirability bias in their assessment of whether the recipient should be allowed to go on the school trip, as they gave a verbal judgement to the experimenter. Children may have felt that the experimenter expected them to reward Nice and punish Naughty, but when they were no longer observed children felt freer to indulge in selfishness to Nice and generosity to Naughty. Alternatively children may have an altruistic self impression, in which they perceive themselves to be generous individuals (Dana et al., 2007; Murnighan et al., 2001). Froming, Nasby and McManus (1998) found allocations of tokens in a DG-like task to be positively related to a prosocial self-schema in 10-13 year-olds. If this is also the case in young children, they may have found that contradicting their self-image with selfish behaviour may have been more costly (in terms of guilt) than to give up stickers to Naughty, especially if empathy has been activated by describing the recipient.

Possession of older siblings did not influence donation behaviour to either Nice or Naughty, nor did it affect deservingness modulation. This is not unexpected, given the null results of sibling status in previous chapters utilising 10 stickers (see Chapters 2 and 4) and supports the suggestion in Chapter 4 that the sibling effect is delicate and is readily influenced by the context of the experiment. It appears that other social norms such as legitimacy in Chapter

4 and reciprocity in the current study override the basic sharing norm that is internalised through possession of older siblings.

When the data were examined according to gender, a differential pattern of results emerged. Boys donated more overall and chose to donate more often to Naughty than did girls. Figures 5.6 and 5.7 show how girls were less generous to Naughty: they appear to take negative information into account more than boys when they are deciding to donate, but there are no differences in positive donations once that decision has been made. When donating to Nice, only positive donations are influenced by gender, with boys appearing more generous than girls; however, when SES is controlled this difference disappears – it appears positive donations do not differ according to gender. As such, it appears that gender differences arise through boys' greater propensity to donate to Naughty: as a group boys seem to discriminate according to valence to a lesser degree than do girls, although within subject analysis with deservingness modulation scores reveal that this difference is not significant.

Confounding variables had little influence upon donations in the Deservingness DG. As in previous chapters, maths ability had no effect upon DG donations irrespective of the recipient, once again confirming that performance in the DG is independent of mathematical ability. A relationship was also not found between ToM ability and behaviour in the Deservingness DG, consistent with the Classic DG group and previous studies with young children (e.g. Lucas et al., 2008). ToM appears to be influential only under conditions of complete anonymity. This is consistent with Froming et al.'s (1985) suggestion that children with high ToM have a better understanding of anonymity, which is reduced by the current study and the increase in empathy brought about by describing the recipient. Time spent with peers was also unrelated to donation behaviour in the Deservingness DG. The

fact that neither time spent with peers nor sibling status influenced donations leads to two possible conclusions: either peers and siblings have no influence upon the acquisition and internalisation of the reciprocity norm at work in the present study, or they were previously influential but internalisation is already complete at this young age so different levels of experience with these groups is no longer reflected in DG behaviour. Due to their importance in social development (Downey & Condrón, 2004; Kitzmann et al., 2002; Sawyer et al., 2002) replication of the study with younger children might be expected to reveal that peers and siblings influence the acquisition of the reciprocity norm; should this not be the case it may be that the norm is actively taught by parents rather than passively acquired through observation and modelling.

The only confounding variable to show a relationship with behaviour in the Deservingness DG was SES: positive donations to Nice increased as SES increased, with a trend in the same direction for donations to Naughty. This effect is in the opposite direction to significant SES effects observed in previous chapters (see sections 2.4.2, 3.4.3 and 4.4.2) and several studies with adults (Carpenter et al., 2005; Kameda et al., 2005; Piff, Kraus, Cote, Cheng, & Keltner, 2010). Evans (2004) and Piff et al. (2010) argue that low SES people have less experience of norms of reciprocity; this may lead to high SES children showing greater reciprocation and thus donating more in the present study. However, this effect is clearly weak as the regression showed that SES failed to significantly predict positive donations to Nice.

5.4.2 Possession of information

Data from the Deservingness DG were compared to those from the Classic DG to examine the influence of possession of information about the recipient upon donation behaviour. Both overall donations and the frequency of donations were increased by possession of

information, whether positive or negative. Positive donations, however, were not influenced by possession of either positive or negative information. Consistent with Servátka's (2010) finding that adults give more when they know about the recipient's previous behaviour even when they know that another person was selfish, this finding that both positive and negative information can increase DG donations suggests that reputation and reciprocity are not solely responsible for the influence of information about the recipient. Children's responses to the question of whether the recipients should be allowed to go on the school trip demonstrated that they clearly perceived Nice to be deserving and Naughty to be undeserving, suggesting that describing the recipient increases the salience of the recipient in the donation decision and so activates an empathic response, leading to increased donations in comparison to the anonymous conditions of the Classic DG. This empathic response may be in the form of empathic concern, as in adults in Chapter 3. However, this only assumes that possessing information about the recipient elicits an empathic response in these young children. Strayer and Roberts (2004) assessed 5-year-olds' responsive empathy on the Empathy Continuum, in which the level of a child's shared affect in response to a number of vignettes is assessed (Strayer, 1993). This, when combined with parent and teacher reports of empathy, was positively correlated with children's prosocial behaviour. As such, children who have greater empathic ability may be more susceptible to the influence of provision of information in the DG and therefore donate more. Nonetheless, in order to confirm this assumption of an empathic response it would be necessary to question children about their responses to the recipient and examine how these relate to DG behaviour. Furthermore, it would be informative to take a within subjects measure of the increase in donations caused by the possession of information and correlate this with trait empathy. Should the influence of possession of information be driven by an empathic response, a positive correlation between these measures should be observed. Moreover, giving to a recipient with negative characteristics

is likely to be less motivated by reciprocity than giving to a recipient with positive characteristics. If this is the case a stronger relationship may emerge between empathy and negative information possession than with positive information possession.

Table 5.1 shows a significant difference in SES between the Classic and Deservingness DGs, which could potentially confound the possession of information analyses. However, the only significant correlations between SES and donation behaviour in the Classic DG or the Deservingness DG occur with positive donations (with a significant positive correlation with Nice and a trend in the same direction with Naughty). The correlation between SES and positive donations in the Classic DG is not significant but is of the same valence, suggesting that the difference in SES between the two studies cannot be solely responsible for the difference in donations between the two studies. Indeed, as SES is lower in the Deservingness DG, one would expect children to donate less in this study if SES were driving results. This is not the case, as children make slightly larger positive donations, a difference that becomes significant for donations to Nice once SES and gender are controlled. One can be confident, therefore, that the observed differences between the two studies are not due to SES, but rather to the increase in empathy elicited by describing the characteristics of the recipient.

Once again, different effects of information possession upon donation behaviour emerged when data were examined by gender. Girls showed little influence of simple possession of information: they were more generous than boys in the Classic DG, and so showed a smaller increase in donations in the Deservingness DG. As discussed above, this is not due to a lack of discrimination between Nice and Naughty. Examination of Figures 5.11 and 5.12 reveals that girls' Classic DG donations lie between those to Nice and Naughty – while this difference is not significant, girls seem to be 'punishing' Naughty by choosing to donate less

often than girls who have no information. It appears that girls incorporate the valence of the characteristics of the recipient into their donation decisions. Conversely, boys are influenced by information possession, donating more overall and choosing to donate more often when they possess both positive and negative information (an effect that remains even when the influence of SES is controlled), supporting the idea that when donating they do not discriminate between Nice and Naughty to the same extent as girls. This possession of information effect appears to be driven by boys' low incidence of donation in the Classic DG (see Figure 5.12).

Positive donations to Naughty did not significantly differ from those in the Classic DG for either boys or girls. While boys (but not girls) initially appeared to make significantly larger positive donations to Nice than in the Classic DG, this different pattern is most likely driven by differences in SES as this effect did not remain significant once SES was controlled. In Chapter 2 it was suggested that the decision to donate reflects adherence to social norms while positive donations reflect altruistic intentions. Should this be the case, it would suggest that it is not altruism that is influenced by possession of information, but the social norm of reciprocity. This would suggest that, should an empathic response be involved, empathy is activating an awareness of social expectations rather than altruism.

While children, particularly boys, are influenced by the mere possession of information about the recipient, they also implement indirect reciprocity by modulating their allocations according to the deservingness of the recipient. Girls appear to be slightly more sophisticated in this process as they made a small, nonsignificant, reduction in their donations to Naughty as well as increasing those to Nice, while boys increase their donations across the board. It is possible that this reflects differing developmental trajectories, with boys slightly behind girls at this young age. If so, boys' behaviour would

be expected to more closely resemble that of girls as they get older, especially given that boys do not normally display greater generosity than girls (Benenson et al., 2007; Gummerum et al., 2008; Gummerum et al., 2010; Harbaugh et al., 2003; Lucas et al., 2008) nor do men normally display greater generosity than women (Bolton & Katok, 1995; Eckel & Grossman, 1998; Kamas et al., 2008). Studies in adults rarely examine gender differences, so it remains unclear whether adult women discriminate more across the characteristics of the recipient and whether men are more sensitive to the possession of information. Indeed, the few studies that have examined gender effects in adults when recipient information is manipulated have found differing effects. Ben-Ner and Kramer (in press) found no gender effect on DG giving, regardless of the social distance between donor and recipient. Ben-Ner, Putterman et al. (2004), on the other hand, found that women reciprocated more than men in the DG after having observed the actions of a third (uninvolved) party. Further study of gender differences in reciprocity in adults is required to determine whether the gender differences observed in the present study represent a permanent difference or whether boys are simply not as advanced as girls in implementing a reciprocity norm at this young age.

The influence of possession of information also showed a different pattern according to sibling status (see Figures 5.14-5.16). Children without older siblings showed an increase in overall donations and the decision to donate when possessing positive and negative information even when SES was controlled (although the effect of negative information did not quite reach significance), with no effect of positive or negative information possession on the size of positive donations. Children with older siblings, however, did not show any effect of the possession of information. Similar to the difference between boys and girls observed above, this appears to be due to children without older siblings having a slightly lower incidence of sharing in the Classic DG. Children with older siblings, like girls, were

slightly more generous to start with and so have not increased their donation behaviour to such a great extent when given information about the recipient. This finding is consistent with the suggestion above that the sibling effect is delicate and is overridden by the reciprocity norm that is likely to be activated in the present study.

In the current study it was necessary to give the recipient a name, both for the purpose of believability and in order to make a clear distinction between the two recipients when questioning the child. Donor/recipient genders were therefore kept congruent in order to minimise potential recipient gender effects. Children may have donated less to a recipient of the opposite sex as children are often reluctant to interact with children of the opposite sex at this young age (Maccoby, 1988), an effect that may extend to prosocial behaviour. Indeed, Hay et al. (1999) found that the sharing behaviour of 3-year-olds was influenced by the gender of the recipient, with girls being less likely to share toys with boys than with girls. Boys, on the other hand, shared equally with girls and boys. Similarly, Ben-Ner, Kong et al. (2004) found that adult women were influenced by recipient gender (men are not), although they found that women donated less to other women. Dufwenberg and Muren (2006), on the other hand, found that both women and men donated more to women. As is often the case with gender effects, findings are unclear and dependent upon the measure in question, but it would be interesting to explore the influence of recipient gender in young children to ascertain how it influences DG behaviour.

While children in the present study were not explicitly instructed to reciprocate, the positive/negative character of the recipient was emphasised when the child made her donation decision (as the aim was to assess whether the child was capable of incorporating this information rather than whether she did so spontaneously). Future work should therefore examine whether character valence is a salient factor in children's altruistic

decision-making when it has not been highlighted to the child. It is possible that less clear-cut differences in donation behaviour would arise with spontaneous assessment and incorporation of personal characteristics. Furthermore, this should not only be compared to the Classic DG, where no information is provided, but also to donation behaviour when neutral information is provided, further clarifying the contribution of character valence independently of information possession.

Similar to studies with adults examining the influence of recipient characteristics upon DG donations, decisions in the present study were based on one instance of good or bad behaviour (although there were multiple examples within that one instance). In reality it is unlikely (although not impossible) that a person would be faced with such limited information and children are known to understand that one isolated incident does not necessarily reflect a permanent personality feature (Heyman & Gelman, 1998). Children in the present study may have taken this into account when making their donations to Naughty and donated due to an assumption that Naughty does not always behave in such a manner. It would be informative, therefore, to look at the influence of a reputation developed over a longer period of time, as it is possible that less altruism to Naughty would be found if Naughty were demonstrated to be consistently badly behaved. An alternative approach would be to examine the influence of a reputation based on a behaviour such as sharing toys with a classmate. Rather than demonstrating a general trait, this would be more closely related to the DG and may produce stronger reciprocity and therefore less altruism to a selfish child. Additionally, it would be interesting to see how children balance contradicting valences of the same type of personality traits (e.g. sometimes naughty, sometimes nice) or contradicting valences of different types of personality traits (e.g. naughty but also honest). Would the effects of these opposing traits cancel one another out? Are some traits valued more highly than others? Do some traits override others, so

that a positive trait is ignored due to the presence of a negative trait? Or does simply increasing the amount of information provided, regardless of valence, increase donations? Further work with both children and adults can answer these questions.

A direct comparison between children's behaviour in the present study and comparable behaviour of adults would also be valuable. While children are likely to be aware that one instance of good or bad behaviour is not necessarily indicative of a permanent character trait, as discussed above, they may nonetheless generalise to a greater extent than do adults and therefore show a greater difference in donations between Nice and Naughty. On the other hand, adults may be more punitive and show a greater deservingness effect than children. Studies of altruistic punishment have shown that adults are prepared to sacrifice their own outcome to punished norm violations, in examples of both direct (e.g. UG; see Camerer, 2003) and indirect reciprocity (e.g. third party altruistic punishment; see Fehr & Fischbacher, 2004), but whether adults or children do so in response to personality characteristics is yet to be explored.

In sum, the present study is the first to add context to the dictator game with children by examining the impact of recipients' characteristics upon DG donations. It has demonstrated that young children are sensitive to the mere provision of information about the recipient. Furthermore, children appear to implement a norm of indirect reciprocity in their DG donations and are able to modulate this reciprocity according to the nature of the recipient's previous behaviour. As such, this study has provided evidence that young children's altruistic behaviour, like that of adults, is both sophisticated and systematic.

Chapter 6: General discussion

6.1 Summary of findings

This thesis sought to examine the influence of demographic, methodological and descriptive factors upon a behavioural measure of altruism in preschool children: the dictator game. Chapter 2 demonstrated that under conditions of scarcity, 4-5 year-old children possessing older siblings are more likely to donate in the DG than those without older siblings. While SES, ToM and gender also independently influenced children's behaviour, DG behaviour was not influenced by time spent with genetically unrelated peers, mathematical ability and endowment size. Chapter 3 demonstrated that differences in altruistic behaviour according to sibling status can arise in adults' DG performance under conditions of scarcity. This difference held even when individual differences in empathy were controlled. This chapter built on the findings of Chapter 2, demonstrating that the influence of sibling status appeared to change over time with the possession of older siblings benefiting children while the possession of siblings in general (i.e. older or younger) benefited adults. There was no effect of gender, nor did SES and time spent with others influence adults' behaviour, possibly due to a lack of sensitivity in the questionnaire measures used to assess these factors. Chapter 4 demonstrated that the methodological influence of earning the endowment had little effect on DG behaviour at a young age, although some children (children with older siblings and girls) appeared to be beginning to modulate their donations in line with a legitimacy norm. Other social factors (SES and time spent with peers) also appeared to increase the implementation of the legitimacy norm. Chapter 5 examined descriptive influences upon children's DG behaviour, finding that young children are sensitive to the mere provision of information about the recipient, particularly boys and children without older siblings, mainly because these children were less generous when no information was provided. Children also appeared to implement a

norm of indirect reciprocity in their DG donations and modulated this reciprocity to some degree according to the valence of the recipient's previous behaviour. Other factors appeared to have little influence in indirect reciprocity. The remainder of this chapter will discuss how these findings relate to one another and how they inform our understanding of altruism.

6.2 The influence of siblings upon altruistic behaviour in the DG

Under conditions of scarcity (i.e., using a reduced endowment of 4 stickers), a clear effect of sibling status was demonstrated in preschool children in the DG, with possession of older siblings appearing to facilitate internalisation of a sharing norm. This influence shifted slightly in adults, with the possession of siblings in general providing an advantage. The fact that some singletons made donations (albeit rarely) demonstrates that the sibling effect is a *facilitation* of norm internalisation rather than the direct cause. Numerous other factors that were not explored in this thesis may be responsible for acquisition of a sharing norm, including parental influences and of course individual altruistic propensity. Time spent with peers is unlikely to be responsible given the null findings in Chapters 2 and 3, although the measure used in this thesis may have lacked sensitivity so confirmation of this finding is necessary.

It appears that the influence of siblings is greatest under conditions of complete anonymity and with a windfall endowment, as when other variables were introduced to the DG (i.e. earning the endowment and reducing anonymity of the recipient) the influence of sibling status was greatly reduced. Indeed, Chapters 4 and 5 made use of an endowment of 10 stickers, which did not show a significant sibling effect in Chapter 2 (although there was a trend in the same direction); as such, a significant sibling effect would not be expected. In Chapter 4, there was little effect of earning the endowment for the group as a whole.

However, children with older siblings made smaller positive donations in the earning treatment than those without and there was a trend towards children with older siblings showing an earning effect in their positive donations. These findings imply that at 4-5 years of age, children with older siblings are beginning to learn a legitimacy norm but children without older siblings are not. In Chapter 5, when children were asked to donate to a recipient who had previously exhibited positive or negative behaviour, children without older siblings raised their donations in line with children with older siblings. Together these findings suggest that a deservingness norm is acquired and internalised sooner than a legitimacy norm, which is just beginning to emerge at this young age when facilitated by possession of older siblings. However, a wider range of ages needs to be studied to confirm this, ideally through longitudinal study. Should these suggestions be upheld, the small effect of possession of older siblings upon the legitimacy norm should shift to possession of siblings in general in older children, or possibly would disappear entirely given that children who spent more time with peers also donated less. Should the possession of siblings (in general, or the possession of older siblings) also influence internalisation of a deservingness norm, examination of a younger age group should reveal sibling status-driven differences in implementation of the deservingness norm as it emerges.

Exactly how siblings facilitate the internalisation of norms cannot be determined by this thesis, but the data do allow speculation. As discussed in section 3.4.4, the combined data from Chapters 2 and 3 are inconsistent with several mechanisms described in Table 3.1: differences in parental investment, dominance hierarchy effects, niche partitioning and deidentification (see Schachter et al., 1976; Sulloway, 2001, 2007). However, data were consistent with several mechanisms: birth order stereotypes (see Herrera et al., 2003; Mancillas, 2006), teaching and modelling (see Brody, 2004; Whiteman & Christiansen, 2008); these mechanisms are also consistent with the results from Chapter 2. While the

stereotype mechanism could not be ruled out on the basis of these findings, this may be because stereotypes reflect real-world differences rather than that they drive behaviour. It seems likely that rather than one mechanism exclusively driving differences in altruistic behaviour, these mechanisms interact. It is possible that the mechanism at play depends upon an individual child's relationship with their sibling (Whiteman et al., 2007a, 2007b). Alternatively, age may be a factor, with teaching and modelling becoming less necessary as the child grows up, while stereotypes may be increasingly influential as the child becomes more aware of them. It is concluded, therefore, that on the basis of this data a combination of teaching, modelling and stereotypes could drive the influence of siblings upon altruistic behaviour. Examination of data from Chapters 4 and 5 allows it to be possible to further discern between these possibilities, with different mechanisms potentially at play depending upon the norm in question.

The lack of a difference between firstborns and singletons in Chapters 4 and 5 and the lack of sibling effect in the implementation of a deservingness norm is inconsistent with the stereotype mechanism, which predicts that singletons are more selfish. It may be that the activation of legitimacy and deservingness norms is sufficient to override this mechanism; however, this seems unlikely given that the stereotype exists due to real-world behaviour in which multiple norms are likely to be at play. It seems reasonable, therefore, to discount stereotypes as influences upon altruistic behaviour when deservingness and legitimacy norms are activated.

It seems likely that teaching is a more rapid process than modelling, as teaching does not require the child to extrapolate the correct behaviour but instead directly imparts it. As such, teaching may enable a child to learn a norm in as little as one instance, while multiple observations are possibly necessary for modelling. The lack of a sibling effect in the

acquisition of a deservingness norm is consistent with it being directly taught to the child, hence its earlier internalisation. The legitimacy norm, on the other hand, may be acquired implicitly through modelling rather than being directly taught, leading children with older siblings to begin to internalise it sooner than children without older siblings due to their likelihood of increased exposure to the norm. This is not quite consistent with the prediction in Table 3.1 as the norm is only just emerging, but should this be the case then it should be acquired by firstborns before later being acquired by singletons. However, spending more time with peers at school should also facilitate internalisation of the legitimacy norm, so this difference may never appear in older children. It should be noted, however, that children may simply be quicker to acquire norms that pertain to others (i.e. recipient deservingness) rather than themselves (i.e. source of the endowment) as not adhering to a norm that affects someone else has wider repercussions than not adhering to a norm that influences only oneself.

It should be noted that Dunn (2006) suggests that it is crucial to take the quality of the sibling relationship into account when examining sibling influences. As mentioned in section 2.1.3, children experience a mixture of positive and negative emotions with regard to their siblings, with some relationships being characterised by hostility, others by empathy and yet others by ambivalence. Those who had experienced cooperation from their siblings were more likely to be cooperative themselves (Dunn & Munn, 1986) and it would have been interesting to explore whether this reciprocity extends to altruism beyond the sibling relationship. It was beyond the scope of the current study to examine the nature of the children's relationships with their siblings, as this would ideally involve observation of sibling interactions. This would have greatly informed how possessing siblings increases altruistic behaviour and future research should seek to explore how the quality of the sibling relationship influences prosocial development.

6.3 The influence of gender upon altruistic behaviour in the DG

There was little direct effect of gender throughout the chapters. In Chapter 2, girls did donate a larger proportion of their least favourite stickers in the 4 condition than did boys, suggesting that girls were more strategic. There was also a trend for girls to donate more often than boys in the 10 condition (which emerged as significant in the Classic DG analyses) that suggested girls made more token donations than boys due to a more sophisticated understanding of the nuances of altruism. The lack of any effect of gender in adults may suggest that this is a temporary state of affairs and boys catch up to girls with age, but given that there was no way to assess whether adults were strategic as all of the coins in their endowment would have the same value to the participant, there is no direct evidence to support this.

Evidence from Chapters 4 and 5 also indicates that girls have a slightly more advanced understanding of the norms that drive behaviour in these DG manipulations. No effect of gender emerged in Chapter 4 when the endowment was earned, when it would arguably be more beneficial to the child to exploit this understanding and be strategic in their donations or make token donations. However, this may reflect the beginnings of earning-based modulation in girls, who are dropping their donations in line with the slightly less generous boys. The pattern of results according to gender in Chapter 5 were at first glance surprising – there were no gender difference in donations to Nice but boys donated more often to Naughty than did girls. As previously discussed (see sections 1.3.1.1 and 5.4.2) when gender effects are found, girls/women tend to be more generous than boys/men (e.g. Eckel & Grossman, 1998; Kamas et al., 2008; Gummerum et al., 2010; Gummerum et al., 2008; Harbaugh et al., 2003). While it is possible that this effect is spurious, an alternative

explanation is that this finding is due to the young age at which assessment has taken place – if boys are slightly behind girls in their internalisation of the deservingness norm, they may not yet discriminate as well according to the valence of the recipient's behaviour and so give more to Naughty than girls. This would suggest that gender differences would disappear as boys learn to discriminate according to valence. Alternatively, boys may not see Naughty's behaviour as worthy of punishment, although their cost-free assessment of the recipients would suggest otherwise.

It is possible that the lack of an effect of gender is due to a lack of power. On the basis of Gummerum et al (2010), who found a significant gender effect (with an effect size of effect size of .54 and power of .64) we can estimate after a power analysis that 76 participants were needed (38 for each gender) to find a reliable effect. In Chapter 3 a gender effect was not found with 78 participants and given the complete lack of even a trend, power is unlikely to be an issue here. In Chapter 4 a gender effect was also lacking, and 56 participants were tested in this study. While this number is a little low, there was once again not even a trend that might be pushed into significance with greater power. As such, it appears that the lack of a gender effect in these chapters is not due to a lack of power.

It would have been interesting to have examined whether the influence of siblings was influenced by gender. There was insufficient power in the present study to perform such a fine-grained analysis, but it has been suggested that girls are socialised to be more prosocial than boys (Cialdini et al., 1981; Croson & Gneezy, 2009; Maccoby, 1988), and given that the sibling effect is presumably driven by socialisation with siblings it is possible that girls would show a stronger sibling effect than boys. Indeed, were this to be the case it may help to explain the heterogeneity in findings according to gender in previous literature (see section 1.3.1.1): it is possible that imbalances in sibling status across gender groups may confound

findings, in some cases pushing a gender effect into significance and in others masking it. In order to confirm this it would be necessary for DG studies examining gender differences to also collect sibling status information; this may lead to more stability in gender findings across the literature.

6.4 Other influences on altruistic behaviour in the DG

The variable that, aside from sibling status and gender, most often influenced DG behaviour was SES. In Chapters 2-4 negative relationships were observed, with participants showing less altruistic behaviour as SES increased. It appears that possessing a lower SES may drive a more egalitarian viewpoint (Kameda et al., 2005), leading to a greater likelihood of sharing in the DG. While this influence did not appear to hold into adulthood, it is likely that the measure taken in adults was not sufficiently sensitive to capture SES effects. SES was calculated from participants' current post code (see section 2.2.1 for a description of this calculation) as many students gave home post codes for which SES information could not be obtained. As such, many adults' SES reflected the student area in which they were living at the time, which may have been very different from their home address. As such, it is likely that the measure of SES in adults was flawed. The direction of the SES effect reversed in Chapter 5, with children being more altruistic as SES increased. However, this influence was weak as it did not remain significant when the influences of other variables were controlled.

ToM ability, as measured by first order false belief tasks, did not appear to influence behaviour on the DG. It is possible that a measure of more sophisticated mentalising ability may have revealed different results; however, the lack of a relationship between altruistic behaviour and perspective-taking in adults suggests that the ability to imagine the other person may not drive behaviour in the DG. This crucial factor may rather be empathy,

especially given the relationship observed in Chapter 3 with empathic concern, and that children's altruistic behaviour increased in Chapter 5 as a result of being given information about the recipient.

It should be noted that in order to reliably confirm the lack of influence of ToM ability on DG behaviour a study designed to assess this would need to be conducted. This would ideally involve a larger battery of ToM tasks as the Sally-Anne task was consistently found to be passed more readily than the deceptive box task. This is because the inhibition demands for the deceptive box task are higher, resulting in greater likelihood of failing the task. A larger battery of ToM tasks would give a more sensitive picture of children's ToM abilities and this combined with a manipulation of perspective-taking would provide an more reliable assessment of the relationship between ToM ability and altruistic behaviour on the DG. Nonetheless, the current findings allow confidence that ToM ability is not confounding the effects of the variables of interest.

No influence of mathematical ability was found in any of the present studies. This, combined with a lack of influence of endowment size and the fact that children appear to respond strategically rather than randomly, suggests that DG behaviour in 4-5 year old children is not driven by a lack of understanding of the numerosities involved. It is possible to attribute this to the steps taken to make the task as simple as possible for children, including placing stickers on an array so that they could keep track of their divisions. Replication of the study without the array would be necessary to confirm this; however, given the complete lack of a maths effect and the consistency across the 4 and 10 conditions it seems more likely that the children already understand the divisions they have made.

Time spent with peers had little influence upon DG behaviour. This may reflect a lack of sensitivity of the measure rather than a lack of influence; this is certainly likely in Chapter 3 as adults' responses on the questionnaire were vague and most probably inaccurate. However, time spent with peers did influence behaviour in the Earning DG in Chapter 4, with children who spent more time with peers appearing to implement a legitimacy norm more and consequently giving less. As such, it seems that this measure was capable of capturing differences according to a child's level of peer interaction, but at this age time spent with peers did not influence behaviour in Chapter 2 or Chapter 5. It should be noted that the one case in which peers were influential was when few children had internalised the relevant norm; as such, it is possible that peers may have an impact at an earlier age when the sharing and deservingness norms activated in these studies have yet to be internalised by as many children.

6.5 Use of preschool children

The variety of effects discussed above demonstrates how interesting it is to examine behaviour in the preschool years, when children are just about to start or have just started school and are expanding their social spheres. As demonstrated, norms have been acquired to differing extents, highlighting differences in developmental trajectories according to sibling status and gender that may not have been observed at older or younger ages. In older children, more children would have internalised norms, resulting in more homogeneous behaviour, while in younger children fewer children would have internalised norms, also resulting in more homogeneous behaviour. This is not to say that examination of different ages would not be informative; indeed as discussed in section 6.2 this would help to reveal developmental trajectories and timelines of acquisition. Ideally this would be done through longitudinal study, which would give a more reliable indicator of the influences upon norm internalisation and altruistic behaviour.

Longitudinal study would also be useful for establishing the stability of the altruistic behaviours observed in these 4-5 year-olds; however, it is possible to speculate on this matter. Eisenberg et al. (1999) suggested that some prosocial responses are stable, finding that spontaneous but not compliant sharing behaviour at 4-5 years significantly predicted self-reported prosocial behaviour in early adulthood. It is difficult to discern how DG behaviour corresponds to this finding given that it appears to lie somewhere between spontaneous and compliant sharing¹¹, as it is suggested to the child that she might give some of her stickers away, rendering behaviour not entirely spontaneous, but it is left up to the child to make the decision in private and so behaviour is therefore not entirely compliant. However, given the similarity in DG behaviour between the children and adult groups as a whole, it seems plausible that this behaviour would demonstrate some stability. Furthermore, Eisenberg et al. suggest that “continuity of socialization influences that affect prosocial behavior” (Eisenberg et al., 1999, p. 1368) is one influence on the stability of prosocial behaviour in their longitudinal study and given the change in the sibling effect from possession of older siblings in childhood to the possession of siblings in general in adulthood observed in Chapter 3, it also seems possible that sibling status may be one of these influences.

6.6 Dealing with DG data

It should be noted that there is some disagreement as to how DG data should be approached, which in some views may have influenced the findings discussed here. Haley and Fessler (2005) suggest that looking at the overall distribution can be misleading as differences in mean offers are generally driven by differences in the numbers of people

¹¹ Spontaneous sharing occurs without prompting while compliant sharing is in response to a direct request.

making a donation. However, Frohlich et al. (2001) suggest that dividing the data according to whether or not the participant made a donation is problematic as this approach groups together large donations with small donations. They argue that donating one item out of 10 is a token donation and thus more similar to donating nothing than it is to donating half and so potentially selfish people are treated the same as generous individuals. These arguments emphasise the importance of taking different approaches to the data, as done here with examination of overall donations (allowing comparison of these results to previous findings), as well as the decision to donate and positive donations, which give very different results. Consistent with the suggestion of Saunders and Lynn (2010), these results suggest that the decision to donate is influenced by social norms and confounding variables. Saunders and Lynn (2010) suggested that the amount donated reflects prosociality, which may well be the case, but the current finding in Chapter 4 that only positive donations are influenced by earning the endowment has demonstrated that norms can also influence the amount donated. These findings emphasise the importance of examining all aspects of donation behaviour rather than simply examining overall donations.

It is important to note at this point that focussing on the acquisition and internalisation of norms is not an argument that people do not differ in terms of a natural inclination for altruism, but rather that learning a norm and applying it differs across individuals. While factors such as sibling status and gender may influence some behaviour, it is also possible that people who are naturally inclined towards altruism are more likely to internalise these norms. It would be interesting to explore this idea further by taking a measure of altruistic propensity and examining how this relates to the implementation of altruistic norms in public and private, as well as the implementation of non-altruistic norms.

6.7 Informing theories of prosociality and altruism

There are explanations for altruism that the findings of this thesis cannot either accept or refute. Warm glow and altruistic self-image are both likely to contribute to some extent, although it is impossible to discern the degree of influence that they exert. However, the present findings can inform several of theories of prosociality and altruism detailed in sections 1.1.1 and 1.2.2. The present findings are in part consistent with Hoffman's (2000) argument that prosocial development is closely coupled with empathic development, given that children in Chapter 5 donated more when empathy was activated by providing information about the recipient. However, Hoffman suggests that pure prosocial motives increase as role-taking ability develops, yet this thesis found little evidence that this influences altruism in either children or adults. Indeed, when a relationship between donations and performance on false belief tasks was observed in Chapter 2 the effect was in the opposite direction to that which would be expected on the basis of Hoffman's theory, with greater ability related to smaller donations. However, it may be that there was insufficient stimulus in the DG for role-taking to influence donations and an effect may be observed in a more information-rich environment. Also inconsistent with Hoffman's theory is the idea that empathising beyond the immediate situation occurs late in development. If empathy does drive behaviour in the DG then this must be occurring beyond the immediate situation as the recipient is not present, or even known (except, to some extent, in Chapter 5). As such, children are either able to empathise beyond the situation earlier than suggested by Hoffman, or else empathy is not the only factor influencing DG behaviour.

The current findings also partly support Cialdini et al.'s (1981) three step model of altruistic development. They argued that while altruism is not rewarding to begin with, children learn its rewarding properties through socialisation. While the present finding that possession of older siblings facilitates norm internalisation is consistent with this suggestion, it is not clear whether this is due to positive reinforcement, nor can this study ascertain the influence

that adults may have upon this process. Cialdini et al. also propose that girls internalise the rewarding nature of altruism earlier than boys, although given girls' generally more sophisticated behaviour across the current studies, resulting in decreased as well as increased altruistic behaviour, the suggestion of norm internalisation seems more plausible. However, they suggest that children only begin to show 'true' altruism by behaving altruistically when unobserved in the teenage years, when the current data suggest that this can occur in the preschool years. It seems that preschool children are capable of much more sophisticated altruistic behaviour than predicted by Cialdini et al.'s model. While Chapters 4 and 5 demonstrate that preschool children are by no means as sophisticated as adults in their altruistic behaviour when it is modulated by other social norms, the internalisation process does appear to be quite rapid, particularly in children with older siblings and girls.

Batson and Shaw's (1991) empathy-altruism hypothesis states that empathic emotional responses to another's need leads to a greater likelihood of altruism, while acknowledging that selfish routes to the same behaviour also exist. The findings in this thesis are consistent with this hypothesis, as empathic concern (over and above personal distress) appears to influence DG behaviour in adults, while children donate more when they are given information about the recipient, which is likely to activate an empathic response. While Cialdini et al. (1997) argue that oneness (i.e. self-other overlap) with the recipient drives altruistic behaviour rather than empathy, the current finding of altruistic behaviour even in completely anonymous conditions, when oneness is likely to be minimal, suggests that this is not always the case.

The current findings are not completely consistent with any one model of prosociality or altruism. However, with the exception of Cialdini et al.'s (1981) three step model of

altruistic development, the influence of norms is little-considered. The argument is not that there is an explicit altruism norm, but rather that people are *not* expected to behave in an altruistic manner, which is one reason why altruism is so valued. Indeed, modesty is esteemed in many cultures, implying that people benefit from keeping their altruistic behaviour to themselves, which would not be the case if there were an altruism norm. Nonetheless, the sibling effect in Chapters 2 and 3 suggests that siblings facilitate internalisation of a sharing norm, which is activated in the anonymous DG but free to be ignored. That it is not ignored is arguably due to altruism. It was also argued that this sharing norm is overridden by other norms that can influence altruistic behaviour in the DG, such as a legitimacy norm and a deservingness norm. Once again, the argument is not that these norms drive altruism itself, but that they modulate its behavioural implementation. A comprehensive theory of altruism, therefore, should incorporate the influence of norms that both increase (e.g. deservingness) and decrease (e.g. legitimacy) altruistic behaviour.

6.8 Onwards from altruism: future directions

This thesis has only touched on the ways in which the DG can teach us about children's altruistic behaviour and the influences upon it. Adding a taking option (Bardsley, 2008; List, 2007), for instance, would add an extra real-world dimension (Levitt & List, 2007), although as discussed in section 1.3.2 this needs to be approached carefully in order that children do not feel that taking is acceptable as this no more reflects the real world than does only being able to give.

Expanding the DG to incorporate altruistic punishment (i.e. converting it to an ultimatum game by allowing the recipient to reject the offer) would help to demonstrate whether children are committed to enforcing norms as well as personally abiding by them. There is evidence to suggest that younger children punish less in a standard ultimatum game,

possibly due to difficulty delaying gratification (e.g. Murnighan & Saxon, 1998). Proposals, but not rejections, also appear to be related to ToM ability, with preschoolers who pass false belief tasks making larger offers than those who did not, demonstrating the importance of perspective-taking in making strategic offers (Takagishi, Kameshima, Schug, Koizumi, & Yamagishi, 2010). Use of an ultimatum game would also potentially help to capture children's awareness of norms before they have been internalised. For instance, should preschool children punish when the proposer is given a windfall endowment but refrain from doing so when it has been earned by the proposer, it would suggest that they are aware of the legitimacy norm but have not yet internalised it (hence the lack of a general earning effect in Chapter 3).

An approach that has yet to be taken, presumably because of the enormous resources that would be required, is conducting a cross-cultural study from a longitudinal developmental perspective. This would help to reveal how norms are transmitted and internalised and at what point in ontogeny children begin to behave in a manner that is characteristic of their culture.

Finally, it would be particularly informative to address the issue of motives. This thesis has from the outset examined altruistic behaviour at the expense of investigating the underlying motives. While the argument that attempting to find a selfish basis of altruistic behaviour undermines altruism still applies, this does not mean that the intention is to argue that motives are not important. It would be interesting to combine the quantitative approach of DG with the qualitative approach of interviewing the children about their reasons for giving. Probing children's DG thinking would help to reveal whether they give because they think it is expected of them, or whether behaviour is more automatic than explicitly considered, to give just two examples.

In sum, this thesis has demonstrated that preschool children are not uniformly selfish, but are capable of similar levels of altruistic behaviour as adults. This behaviour is influenced by numerous factors intrinsic to the child, such as their gender, sibling status and SES. It is also modulated by both descriptive and methodological changes to the DG procedure, which each activate different norms that children appear to have internalised to different extents. As discussed above, the issue of motives has been intentionally sidestepped. However, this thesis will finish with a personal view on this matter. The idea that pure altruism does not exist as a selfish motive is always present seems rather bleak and potentially misleading. For example, a mother is evolutionarily, genetically and hormonally driven to love her child, but few would argue that this means that no mother truly loves her child. Similarly, just because a person who runs into a burning building to save a trapped child could not live with himself for not taking action, does it mean that this behaviour is no longer altruistic? If altruism is defined out of existence, rather than proving altruism fallacious, perhaps the definition of altruism itself should be re-examined.

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Appendices

Appendix 1

Questionnaire sent to parents



Cognitive Development and Learning Group

Questionnaire

Title of project: The development of altruism

Investigator: Ellie Limback
(Supervisor: Dr. Dana Samson)

School of Psychology, University of Nottingham

We would appreciate it if you would complete the following questionnaire about your child. This information will not affect your child's participation in the study, but it will be useful for us to be able to take it into consideration when we look at the study results. If you do not feel comfortable answering any of the questions then feel free to leave them blank.

1. Please provide details of how many family members you have living at home and their relationship to your child. Please also provide the ages and genders of any of your child's siblings:

2. How many hours per week does your child spend at school?

3. Does your child take part in any extra-curricular activities or go to a nursery, playgroup or childminder where they interact with other children?

YES/NO

4. If you answered 'yes' to question 3, please provide details, including how many hours they spend there a week:

Signature of parent/guardian: _____ Date: _____

Name (block capitals): _____

Appendix 2

Experimental script

Sit the child at the table, experimenter sits opposite.

We're going to do some things together, is that alright? The first thing that we're going to do is with stickers.

Uncover a selection of stickers in front of the child in a random arrangement (ensure each faces the child).

Look carefully at these stickers and tell me which one out of all of the stickers you would like to keep the most.

Allow the child to make their selection – make a note of the sticker and remove it from the group, placing it on the appropriate array.

Now which of all the stickers that are left would you like to keep the most?

Repeat as above until the child has selected four or ten stickers, depending on the trial.

Well done, that's lovely! We've finished choosing stickers for now, so I'm going to put the rest away.

Remove the leftover stickers and place out of sight; place the array in front of the child.

Look, these are the stickers that you chose, and guess what? You really can keep them! They're all yours to take home with you if you want to. Before you take them away, though, I want to ask you something. I don't have enough stickers to give to all of the children that I play with, so if you want to you can give some of your stickers to someone else. The stickers are all yours so it's up to you whether you give any away – you don't have to give any away at all if you don't want to. If you do want to give some of your stickers to someone else then they'll be gone forever – you won't be able to have them back. If you decide to give some of your stickers away then you can put them into one of these envelopes.

Show the child the two envelopes.

The stickers you decide to take home will go in this envelope. I'll write your name on your envelope so you can remember which one is yours.

Write the child's name on one of the envelopes.

Look, I'll put a picture to colour into each envelope so that everyone gets something in their envelope. Put the stickers you want to keep in your envelope first. Then put the card (*gesture to the card*) with the stickers on it that you want to give away into the other envelope. If you don't want to give any stickers away at all then just put the empty card (*gesture*) into the envelope. It'll be a secret whether you give any stickers away so I will close my eyes and put my hands over them like this so I can't see what you do.

Demonstrate eyes shut with hands over them.

Remember, you don't have to put any stickers in this envelope if you don't want to because they're all yours, you can put all of them into your envelope. If you do give some stickers away then you won't be able to have them back. Do you understand?

Repeat the instructions if the child does not understand.

Okay, I'm going to shut my eyes and put my hands over them now. You put all the stickers that you want to keep in this envelope (*indicate*) and put all the stickers that you want to give away on their card in this envelope (*indicate*) and you can tell me when you have finished. Okay?

Close eyes and cover with hands. When the child indicates that they have finished:

Well done. Shall we close the envelopes?

If necessary, help the child to seal the envelopes.

Now we can put your envelope over here out of the way and you can post this envelope into this box so I can give it to someone else on another day.

Put the child's envelope on one side and allow the child to post the other envelope into the box, which contains several similar envelopes.

Now we're going to do the same thing again, but this time we're going to use some different stickers.

Place the alternative selection and alternative array in front of the child.

Look carefully at these stickers and tell me which one out of all of the stickers you would like to keep the most.

Allow the child to make their selection – make a note of the sticker and remove it from the group, placing it on the appropriate array.

Now which of all the stickers that are left would you like to keep the most?

Repeat as above until the child has selected four or ten stickers, depending on the trial.

Well done, that's lovely! We've finished choosing stickers now, so I'm going to put the rest away.

Remove the leftover stickers and place out of sight; place the array in front of the child.

These stickers are yours to keep, just like before, but if you want to you can give some of these stickers to another child that doesn't have any. Remember, the stickers are all yours so it's up to you whether you give any away – you don't have to give any away at all if you don't want to but if you do give some of your stickers to someone else then they'll be gone forever – you won't be able to have them back. If you do want to give some of your stickers to someone else then you can put them into one of these envelopes.

Show the child the two envelopes.

Remember, the stickers you decide to keep will go in this envelope, so I'll write your name on your envelope so you can remember which one is yours.

Write the child's name on one of the envelopes.

I'll put a picture to colour into each envelope again so that everyone gets something in their envelope. Put the stickers you want to keep in your envelope first. Then put the card (*gesture*) with the stickers on it that you want to give away into the other envelope like this. If you don't want to give any stickers away at all then just put the empty card (*gesture*) into the envelope. It'll be a secret whether you

give any stickers away so I will close my eyes and put my hands over them again so I can't see what you do. Remember, you don't have to put any stickers in if you don't want to because they're all yours, but if you do give some away you won't be able to have them back. Do you understand?

Repeat the instructions if the child does not understand.

Okay, I'm going to shut my eyes and put my hands over them now. You put all the stickers that you want to keep in this envelope (indicate) and all the stickers that you want to give away on their card in this envelope (indicate) and you can tell me when you have finished. Okay?

Close eyes and cover with hands. When the child indicates that they have finished:

Well done. Shall we close the envelopes?

If necessary, help the child to seal the envelopes.

Now we can put your envelope over here out of the way and you can post this envelope into the box so I can give it to someone else on another day.

Put the child's envelope on one side and allow the child to post the other envelope into the box.

Now we're going to play a game with some blocks like these.

Show the child the blocks and place two mats on the table side by side.

What colour is this (indicate)? What colour is this (indicate)?

Reinforce which colour is which if the child does not know.

I'm going to give you some blocks and I'd like you to put some on the yellow mat and some on the blue mat so that both mats have the same amount. Let me show you.

Put two blocks together between the two mats.

Look, I've got some blocks here, watch me as I put the blocks on the yellow and blue mat.

Put one block on the yellow mat and one block on the blue mat.

Look, there is one block on the blue mat and one block on the yellow mat. So both mats have now the same amount. Do you see that there is the same amount on both mats? Now it's your turn.

Put set of 4 blocks between the two mats.

Can you put some of these blocks on the yellow mat and some on the blue mat and make sure that both mats have the same amount?

Wait until child seems to have finished.

Have you finished? Well done.

Repeat twice more, using different blocks each time. Conduct three further trials with 10 blocks.

That game's all finished now, shall we play another game? For this game we need my special cards. Look – each card has spots on it.

Place two cards in front of the child as per the response sheet.

Do these both have the same number of spots?

If the answer is 'yes', move onto the next trial. If the answer is 'no', ask:

Which one has more spots?

Continue as per the response sheet until all 12 trials have been conducted.

Well done, shall we play one more game before we finish? For this game I'm going to show you some things and ask you some questions about them, okay?

Show the child the box with the banana in it.

Look at this box. What do you think is inside?

Allow the child to respond.

Shall we have a look at what's inside it?

Open the box and remove the banana. Give it to the child to hold.

What's this?

Allow the child to respond. If they do not respond 'banana', say:

It's a banana! What is it?

Repeat as above until the child gives the correct response. Return the banana to the box and close it again.

Your mummy/daddy hasn't seen inside this box. If mummy/daddy sees the box all closed up like this, what will [s]he think is inside it? Will [s]he think there is a banana inside it or will [s]he think there are chocolate biscuits inside it?

Allow the child to respond.

When you first saw the box, before we opened it, what did you think was inside it? Did you think there was a banana inside it or did you think there were chocolate biscuits inside it?

Allow the child to respond.

Does it look like there is a banana inside the box or does it look like there are chocolate biscuits inside?

Allow the child to respond.

What's really inside this box? Is there really a banana inside it, or are there really chocolate biscuits inside?

Allow the child to respond.

Okay, now let's look at this story.

Read Sally-Anne story, then ask the following questions:

Where will Sally look for the ball first?

Allow the child to respond.

Where is the ball really?

Allow the child to respond.

Where was the ball in the beginning?

Allow the child to respond.

Well done, we've finished everything! Thank you for all your help!

Would you like to take your envelopes back to your classroom now?

Allow the child to return to their classroom.

End of session.

Appendix 3

Adults' instruction sheet



Human Development and Learning

Group

Title of project: Social behaviour and emotions

Investigator: Ellie Limback

(Supervisors: Dr. Dana Samson and Dr. Nikki Pitchford)

School of Psychology, University of Nottingham

Participant instructions – please read carefully

The study

This study examines social behaviour and emotions. You will be asked to complete a set of short questionnaires. You will also be given several coins which are yours to take away with you; however, if you wish you may anonymously give some of your coins to another person.

The sections below explain the different steps involved in the study.

Brown envelopes

The experimenter will place some £1 coins on the table which are all for you to keep. However, if you wish, you can give some coins to another person. Should you wish to do so, simply put the coins you wish to give away into the numbered brown envelope. The content of that envelope will be given to a random person on campus at a later date. The brown envelope marked “Take this envelope with you” is your envelope where you can put any coins you decide to keep. You will notice that there is a complimentary Sudoku puzzle in each envelope so that everyone has something in their envelope.

It is entirely up to you how many (if any) coins you place in the numbered envelope. When you have made your decision, seal both envelopes and place the numbered envelope into the locked box. This process is completely anonymous – you will not be told anything about the other person and they will know nothing about you.

White envelope and questionnaires

There are three short questionnaires placed face down. Please turn the questionnaires over only once you have placed your brown numbered envelope in the locked box. Please complete the questionnaires, then seal them into the numbered white envelope and put it into the locked box.

Anonymity

To ensure anonymity, the box will only be opened when there are at least ten brown and ten white envelopes inside. All brown envelopes will be opened and their contents recorded before being sealed into new, unmarked envelopes. This will be done by another experimenter whom you will not meet. The questionnaires will remain confidential and will be kept in a locked filing cabinet. There will be no means of associating the contents of either of your envelopes with you. The numbers on your envelopes are simply for the purposes of matching the questionnaires to the brown numbered envelopes. These numbers enable this match to be made without identifying you in any way – this number will never be associated with you. The process is completely anonymous.

Checklist

Please tick off each item on the checklist as you complete it. The experimenter will check this at the end of the study to ensure that everything has been completed.

What to do next

The experimenter will give you your coins, leave the room and wait at the end of the corridor. Please fetch the experimenter when you have finished and she will provide you with your raffle ticket. If you have any questions, please ask the experimenter.

Thank you for your participation.

Ellie Limback

Telephone: 0115 8468188

Email: lwxe13@psychology.nottingham.ac.uk

Dr. Dana Samson: dana.samson@nottingham.ac.uk

Dr. Nikki Pitchford: nicola.pitchford@nottingham.ac.uk

Appendix 4

Adults' questionnaire

Please respond to the questions below. All information will be strictly confidential and completely anonymous – there will be no means of associating your responses with you personally. Please try to answer all questions, but if you are uncomfortable answering any questions then please leave them blank. When you have completed the questionnaire, please fold it into the envelope provided, seal and post it into the locked postbox.

Date of birth (dd/mm/yyyy): _____

Gender (please circle as appropriate): Male Female

Course: _____

Year of course: _____

Home post code (during holidays): _____

Post code of your longest place of residence between ages 2 and 18: _____

Do you have any brothers or sisters? Yes No

If yes, please give details of their dates of birth and genders below:

Date of birth	Gender	Are they a full, half or step sibling?	Did you live with them as a child?	Approximately how many years did you live with them for?

No

Appendix 5 – Interpersonal Reactivity Index (Davis, 1980)

INTERPERSONAL REACTIVITY INDEX

The following statements ask about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, circle the appropriate letter. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

	A	B	C	D	E
	Does NOT describe me AT ALL				Describes me VERY WELL
1. I daydream and fantasize, with some regularity, about things that might happen to me.	A	B	C	D	E
2. I often have tender, concerned feelings for people less fortunate than me.	A	B	C	D	E
3. I sometimes find it difficult to see things from the "other guy's" point of view.	A	B	C	D	E
4. Sometimes I don't feel very sorry for other people when they are having problems.	A	B	C	D	E
5. I really get involved with the feelings of the characters in a novel.	A	B	C	D	E
6. In emergency situations, I feel apprehensive and ill-at-ease.	A	B	C	D	E
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.	A	B	C	D	E
8. I try to look at everybody's side of a disagreement before I make a decision.	A	B	C	D	E
9. When I see someone being taken advantage of, I feel kind of protective towards them.	A	B	C	D	E
10. I sometimes feel helpless when I am in the middle of a very emotional situation.	A	B	C	D	E
11. I sometimes try to understand my friends better by imagining how things look from their perspective.	A	B	C	D	E
12. Becoming extremely involved in a good book or movie is somewhat rare for me.	A	B	C	D	E

Does NOT describe me AT ALL					Describes me VERY WELL				
A	B	C	D	E	A	B	C	D	E
13. When I see someone get hurt, I tend to remain calm.									
14. Other people's fortunes do not usually disturb me a great deal.									
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.									
16. After seeing a play or movie, I have felt as though I were one of the characters.									
17. Being in a tense emotional situation scares me.									
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.									
19. I am usually pretty effective in dealing with emergencies.									
20. I am often quite touched by things that I see happen.									
21. I believe that there are two sides to every question and try to look at them both.									
22. I would describe myself as a pretty soft-hearted person.									
23. When I watch a good movie, I can very easily put myself in the place of a leading character.									
24. I tend to lose control during emergencies.									
25. When I am upset at someone, I usually try to "put myself in his shoes" for a while.									
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.									
27. When I see someone who badly needs help in an emergency, I go to pieces.									
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.									

Appendix 6 – Alpha coefficients for the IRI (Davis 1980)

	Fantasy	Perspective taking	Empathic concern	Personal distress
Males	.78	.75	.72	.78
Females	.75	.78	.70	.78

Appendix 7

Script for previous encounter with recipient

Story A

I was at another school yesterday and I went to a cooking lesson where they were baking a cake. When they all came in to the classroom the teacher asked them to sit quietly in their places. Ted/Beth* came in sat in his/her place like the teacher had asked them to and because Ted/Beth listened to the teacher she was very happy with him/her. She then asked him/her to get the sugar which he/she took from the cupboard and put it nicely on the table. When they had finished making the cake and it had come out from the oven, the teacher gave Ted/Beth a knife and he/she cut it in to nice neat pieces so that everyone received a piece of cake to eat. At the end of the lesson the teacher was pleased with Ted/Beth and said well done.

Story B

Oh I'll tell you another story about the school I went to yesterday; I also went in to another cooking lesson where they were baking a cake. When they all came in to the classroom the teacher asked them to sit quietly in their places. Bill/Jane* came and ran around the tables shouting and because Bill/Jane did not listen to the teacher she was very cross with him/her. She then asked him/her to get the eggs which he/she threw on the floor and broke. When they had finished making the cake and it had come out from the oven, the teacher gave Bill/Jane a knife and he/she squashed it so that nobody could eat the cake anymore. At the end of the lesson the teacher was cross with Bill/Jane and told him/her off.

* If the participant has the same name as the character, an alternative name will be used (Dan/Kate or Luke/Claire)

Appendix 8

Counterbalancing Chapter 5

	Singletons		Firstborns		Lastborns		Total
	Girls	Boys	Girls	Boys	Girls	Boys	
Nice first	6	4	6	6	6	4	32
Naughty first	7	4	7	7	8	10	43
Total	13	8	13	13	12	14	75